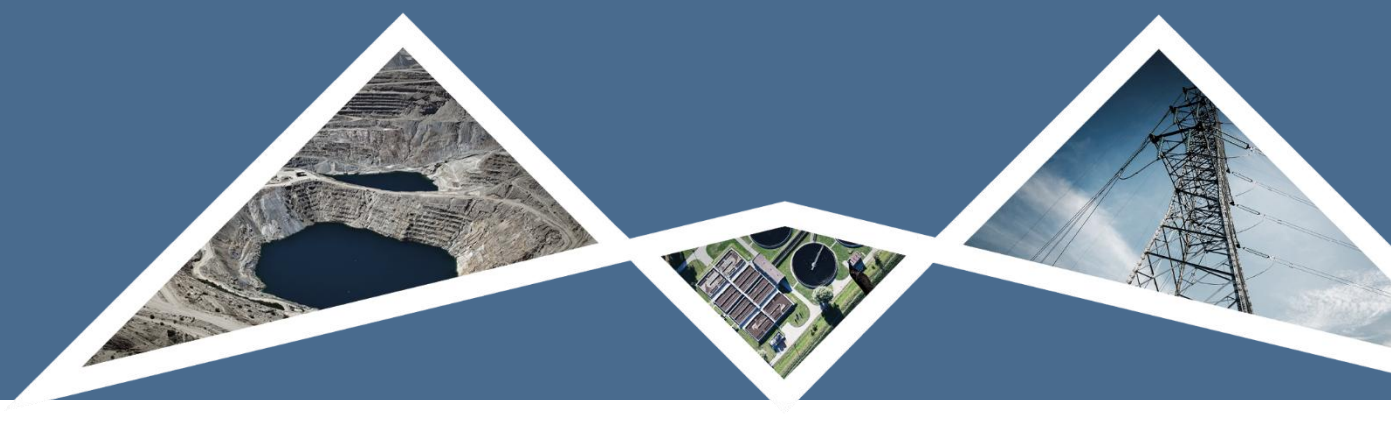
EIMS | ENVIRONMENTAL IMPACT MANAGEMENT SERVICES

T 011 789 7170 E info@eims.co.za W www.eims.co.za

BASIC ASSESSMENT REPORT

RUSTENBURG CHROME MINE EXPANSION PROJECT
OPEN CAST AREA 3
NW30/5/1/2/2/336 MR



DOCUMENT DETAILS

EIMS REFERENCE: 1727

DOCUMENT TITLE: RUSTENBURG CHROME MINE EXPANSION PROJECT
OPEN CAST AREA 3 NW30/5/1/2/2/336 MR

DOCUMENT CONTROL

	NAME	SIGNATURE	DATE
COMPILED:	Vukosi Mabunda / Monica Niehof		2025/11/17
CHECKED:	Monica Niehof / Liam Whitlow		2025/11/18
AUTHORIZED:	Liam Whitlow		2026/01/23

REVISION AND AMENDMENTS

REVISION DATE:	REV #	DESCRIPTION
2026/01/23	ORIGINAL DOCUMENT	Basic Assessment Report for Review

Table of Contents

List of Figures

List of Tables

Appendices

ACRONYMS AND ABBREVIATIONS

BA:	Basic Assessment
BAR:	Basic Assessment Report
CA:	Competent Authority
CBA	Critical Biodiversity Area
CR:	Critically Endangered
DALRRD:	Department of Land Reform and Rural Development
DFFE:	Department Forestry, Fisheries and Environment
DMPR:	Department of Mineral and Petroleum Resources (formally DMRE)
DMRE:	Department of Mineral Resources and Energy
DWS:	Department of Water and Sanitation
EA:	Environmental Authorisation
EAP:	Environmental Assessment Practitioner
EAPASA:	Environmental Assessment Practitioners Association of South Africa
ECA:	Environmental Conservation Act No. 73 of 1989
ECO:	Environmental Control Officer
EIA:	Environmental Impact Assessment
EIMS:	Environmental Impact Management Services (Pty) Ltd
EMP:	Environmental Management Plan
EMPr:	Environmental Management Programme
EN:	Endangered
ER:	Engineer's Representative
ERAP:	Emergency Response Action Plan
ESR:	Environmental Site Representative
ESA	Ecological Support Area
GA:	General Authorisation
GIS:	Geographic Information System

GN	Government Notice
Ha:	Hectare
HGM:	Hydrogeomorphic
HIA:	Heritage Impact Assessment
I&AP:	Interest and Affected Party
I&APs	Interested and Affected Parties
IEM	Integrated Environmental Management
km:	kilometre
LC:	Least Concern
LDM:	Lejweleputswa District Municipality
LOM:	Life of Mine
ℓ/s:	Litres per second
LT:	Least Threatened
MA:	Mining Area
MHSA:	Mine Health and Safety Act 29 of 1996
mm:	millimetre
MPRDA:	Mineral Petroleum Resources Development Act
MR:	Mining Right
MSDS:	Material Safety Data Sheet
MPRDA:	Mineral and Petroleum Resources Development Act, 2002
NEMA:	National Environmental Management Act (Act No. 107 of 1998)
NEM:BA:	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NEM:WA:	National Environmental Management: Waste Act 59 of 2008
NWA:	National Water Act
PAOI:	Project Area of Influence
PHRAG:	Provincial Heritage Resources Authority Gauteng
PIA:	Palaeontological Impact Assessment
PPP	Public Participation Process
SACNASP:	South African Council Natural and Scientific Professions
SAHRA:	South African Heritage Resources Agency
SANBI:	South African National Biodiversity Institute
SANS:	South African National Standards
SCC:	Species of Conservation Concern
SDF:	Spatial Development Framework
S&EIA	Scoping and Environmental Impact Assessment
TSF:	Tailings Storage Facility

VU: Vulnerable

WUA: Water Use Authorisation

WULA: Water Use License Application

GLOSSARY OF TERMS

This section provides a catalogue of terms and definitions, which may be used in this report and, or other documents drafted for the project.

Glossary of terms

Term	Definition
Alien Invasive Species	Species of plants, animals or other organisms that are not indigenous to a region and which easily spread and destroy the indigenous plant species, taking over an area and causing biological and socio-economic harm.
Buffer	A strip of land surrounding a wetland or riparian area in which activities are controlled or restricted.
Basic Assessment Process	An environmental assessment process that is undertaken in line with Listing Notices 1 and 3 in terms of the NEMA EIA Regulations with the aim of obtaining Environmental Authorisation.
Clearing/Clearance	Clearing/Clearance refers to the removal of vegetation through permanent eradication and in turn no likelihood of regrowth. 'Burning of vegetation (e.g. fire-breaks), mowing grass or pruning does not constitute vegetation clearance, unless such burning, mowing or pruning would result in the vegetation being permanently eliminated, removed or eradicated'.
Competent Authority	An organ of state charged by the National Environmental Management Act (NEMA) with evaluating the environmental impact of an activity and, where appropriate, with granting or refusing an environmental authorisation in respect of that activity.
Conservation Plan Areas (C-Plan Areas)-	A tool developed by the Environmental Provincial Department to identify sensitive areas. The main purposes of this tool is to: • serve as the primary decision support tool for the biodiversity component of the Environmental Impact Assessment (EIA) process. • inform protected area expansion and biodiversity stewardship programmes in the province; and serve as a basis for development of Bioregional Plans in municipalities within the province. Some of the aspects that inform the identification of C-Plan Areas include Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESA's), Watercourses, Ridges, Protected Areas, etc
Critical Biodiversity Area	Areas that are deemed important to conserve ecosystems and species. For this reason, these areas require protection.
Cultural significance	Means aesthetic, architectural, historical, scientific, social, spiritual, linguistic, or technological value or significance.

Term	Definition
Development	Means the building, erection, construction or establishment of a facility, structure, or infrastructure, including associated earthworks or Quarries, that is necessary for the undertaking of a listed or specified activity, but excludes any modification, alteration or expansion of such a facility, structure or infrastructure, including associated earthworks or quarries, and excluding the redevelopment of the same facility in the same location, with the same capacity and footprint.
Duty of Care	Every person who causes, has caused or may cause significant pollution or degradation of the environment to take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environmental is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution and degradation of the environment."
Decommissioning	Means to take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily recommissioned.
Environment	the surroundings within which humans exist and that are made up of— (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.
Ecological Support Area	Areas that support the ecological functioning of protected areas or CBAs or provide important ecological infrastructure.
Environmental Assessment Practitioner	Individual responsible for the planning, management, coordination or review of environmental impact assessments, strategic environmental assessments, environmental management programmes or any other appropriate environmental instruments introduced through regulations.
Environmental Authorisation	This is a decision by a Competent Authority to authorise a listed activity in terms of the National Environmental Management Act (NEMA). The authorisation means that a project, either in totality or partially, can commence subject to certain conditions. The Competent Authority has a right to refuse to grant authorisation for a project in totality or partially.
Environmental Impact Assessment Process:	An environmental assessment process that is undertaken in line with Listing Notice 2 the NEMA EIA Regulations with the aim of obtaining Environmental Authorisation.
Environmental Management Programme:	A programme with set objectives and timeframes that seek to achieve a required end state and describes how activities that have or could have an adverse impact on the environment will be mitigated, controlled, and monitored.
Flora	Plant life that occurs in a specific geographical region and/habitat.
Fauna	Animal life that occurs in a specific geographical region and/habitat.

Term	Definition
Heritage Resource	Means any place or object of cultural significance.
Indigenous Vegetation	plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.
Interested and Affected Party	in relation to an application for Environmental Authorisation, this refers to an interested and affected party whose name is recorded in the register opened for that application in terms of regulation 42 of the NEMA EIA Regulations. This party will ideally be interested in the development but also affected by the proposed application and have a certain interest in the application.
Public Participation Process	In relation to the assessment of the environmental impact of any application for an environmental authorisation, means a process by which potential Interested and Affected Parties are given opportunity to comment on, or raise issues relevant to, the application.
Regulated area of a watercourse:	• The outer edge of the 1:100-year flood line and /or delineated riparian habitat whichever is the greatest measured from the middle of a river, spring, natural channel, lake or dam. • In the absence of a determined 1:100-year flood line or riparian area, the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench (subject to compliance to section 144 of the Act). • 500m radius from the delineated boundary of any wetland or pan.
Riparian Area	A Habitat that includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas.
Species of Conservation Concern	IUCN Red List definition: Threatened species, and other species of significant conservation importance: Extinct, Extinct in the Wild, Near Threatened, Data Deficient. In South Africa, the following additional categories are added: Rare, Critically Rare.
Threatened or Protected Species	These refers to either plants or animals that are at a threat of Extinction or are protected due to their high conservation value or national importance.
Urban Edge	A demarcated edge of an area that is used as land use management tool to manage, direct and control the outer limits of development growth around an urban area. The aim is to control urban sprawl due to its associated adverse impacts.
Watercourse	(a) a river or spring; (b) a natural channel in which water flows regularly or intermittently; (c) a wetland, lake or dam into which, or from which, water flows; and

Term	Definition
	(d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks;
Wetland	Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

EXECUTIVE SUMMARY

Environmental Impact Management Services (Pty) Ltd (EIMS) has been appointed as the Environmental Assessment Practitioner (EAP) for Rustenburg Chrome Mines (Pty) Ltd. EIMS will manage the environmental authorisation and consultation process for the proposed expansion of the existing opencast pit by approximately 16 Ha, at RCM's existing mining operations near Kroondal in the Rustenburg Local Municipality, North West Province. No other new infrastructure is applied for in this application.

The applicant owns and operates RCM underground and opencast chrome mining operations and have two mining rights: NW30/5/1/2/2/336 MR and NW30/5/1/2/2/274 MR.

EIMS will compile and submit the required documentation in support of applications for: Environmental Authorisation in accordance with the National Environmental Management Act (NEMA - Act 107 of 1998) EIA Regulations, 2014 as amended, Listing Notice 1, Listed Activities 21D, and 27; and Listing Notice 3, Activity 12.

PURPOSE OF THE BASIC ASSESSMENT REPORT

The objective of the basic assessment process is to, through a consultative process–

- determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- identify the alternatives considered, including the activity, location, and technology alternatives;
- describe the need and desirability of the proposed alternatives,
- through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage , and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on the these aspects to determine:
    - the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
    - the degree to which these impacts—
        - can be reversed;
        - may cause irreplaceable loss of resources; and
        - an be managed, avoided or mitigated;
- through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—
    - identify and motivate a preferred site, activity and technology alternative;
    - identify suitable measures to manage, avoid or mitigate identified impacts; and
    - identify residual risks that need to be managed and monitored.

PUBLIC PARTICIPATION PROCESS

According to Section (2)(4)(f) of NEMA, the participation of all Interested and Affected Parties (I&APs) must be promoted and all potential I&APs must be informed early and in an informative and proactive way regarding applications that may affect their lives or livelihood. To give effect to the above sections, it is essential to ensure that there is an adequate and appropriate opportunity for Public Participation (PP) in decisions that may affect the environment. The Public Participation Process (PPP) for the proposed project is undertaken in accordance with the requirements of NEMA in line with the principles of Integrated Environmental Management (IEM). The PPP commenced on the 27th of November 2025 with an initial notification and call to register as interested and

affected parties (I&APs). The comments received from I&APs during the initial call to register and commenting period so far have been captured in Public Participation Report in Appendix C.

Comments received during the public review and comment of this report will also be collated and added to the Public Participation Report which will be submitted to the Competent Authority (CA) together with the final submission for review and decision-making.

This BAR will be available for public review and comment for a period of 30 days from 27 January 2026 to 26 February 2026 Contact details are provided below:

- Environmental Impact Management Services (Pty) Ltd (EIMS)
- P.O. Box 2083 Pinegowrie 2123
- Phone: 011 789 7170 / Fax: 011 787 3059
- Contact: Ms Mbali Tshabalala
- EIMS Reference No: 1727
- Email: rcmarea3@eims.co.za

After a decision has been reached by the CA, Chapter 2 of the National Appeal Regulations 2025 makes provision for any affected person to appeal against the decision. Within 20 calendar days from the date that the decision is sent by the decision-maker, or, where applicable, by the applicant to registered interested and affected parties; or within 30 calendar days from the date that the decision is received, where the appeal is submitted in terms of section 43(8) of the Act, the appellant must submit the appeal to the appeal administrator. EIMS will communicate the decision of the Competent Authority and the way appeals should be submitted to the Minister and to all I&APs as soon as reasonably possible after the final decision has been received.

PROJECT ALTERNATIVES AND ENVIRONMENTAL IMPACT ASSESSMENT

In terms of the EIA Regulations published in Government Notice (GN) R982 of 2014, as amended, feasible and reasonable alternatives must be identified and considered within the BA process. According to the above-mentioned, an alternative is defined as *"…in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the:*

(a) property on which or location where it is proposed to undertake the activity;

(b) type of activity to be undertaken;

(c) design or layout of the activity;

(d) technology to be used in the activity;

(e) operational aspects of the activity; and

(f) includes the option of not implementing the activity."

The alternatives discussed in this report include the No-Go Option as well as Process Alternatives. The preferred option under each category of alternatives is discussed in detail in Section 5 of this report.

The following specialist studies were conducted and the main findings and recommendations are included below.

Groundwater Assessment.

The current impacts from the surrounding infrastructure were assessed to have already impacted the groundwater environment is terms of quality and quantity. The additional Area 3 opencast will not have a higher impact on the current groundwater environment. Therefore, the current and future impacts can be contained through the proposed mitigations. The potential environmental impacts associated with the proposed new infrastructure—such as the Area Opencast Area 3 expansion have been reviewed in the context of the existing

operations assessed. Based on the nature, location, and function of the planned infrastructure, the associated impacts are anticipated to be materially similar in type, extent, and significance to those already identified and assessed.

Impacts during the Construction and Operational Phases:

- Impact of Mine Dewatering: According to the calibrated groundwater model, inflows to the expanded pit area (Area 3) are expected to increase to approximately 500 m^3/day. This projected rate is consistent with current inflow volumes measured in Area 1, which is presently under active mining, and therefore considered a realistic estimate. The model further indicates that the 5 m drawdown cone will not extend beyond 1 km from the pit boundary, primarily due to the low permeability of the surrounding noritic lithologies, which significantly limit lateral groundwater movement.

- Impact of Mine Water Contamination: Groundwater quality that enters the opencast workings will be pumped out as part of the dewatering; therefore, the impact will be minor. The opencast working will remain a sink operationally; therefore, contamination will be contained withing the open cast mine.

Impacts during the Closure and Post Closure Phases:

Although limited information exists in order to determine the closure impact of the open cast area, the geohydrologist is of the opinion, in their experience at dealing with similar mining operations in the area, that decant is highly unlikely due to the high evaporation rates (2000 mm/a) that exists and low groundwater ingress areas. The rewatering of these pits usually does not reach decant elevations and acts as a sink for over 100 years.

Importantly, the dewatering impact within the newly developed section will be mitigated by prior depressurisation and aquifer storage depletion resulting from ongoing mining in adjacent areas. As a result, the overall impact of additional mine dewatering on the regional aquifer system is assessed to be low in both magnitude and significance. Continued groundwater level monitoring in perimeter boreholes will ensure that drawdown predictions remain within the expected range and that any deviations can be promptly managed through adaptive abstraction control.

Specialist opinion:

The potential environmental impacts associated with the proposed new expansion—such as the Area 3—have been reviewed in the context of the existing operations currently being assessed. Based on the nature, location, and function of the planned infrastructure, the associated impacts are anticipated to be materially similar in type, extent, and significance to those already identified and assessed. However, since limited information exists in determining the impact for the closure and post-closure phases and the impact from underground mining, various recommendations for determining, mitigating, managing and monitoring of the impacts and risks are provided below. The project is considered viable from a groundwater perspective, provided that the recommended mitigation measures and supporting studies are implemented to better define water availability, aquifer parameters and quality on site. The associated risks can be effectively managed through the existing approved and new recommended measures below.

Area 3 is expected to be the deepest section of the opencast development and will ultimately serve as the access point into the underground. Given this, it is critical that the current flooded level within the surrounding underground workings is confirmed prior to mining progresses into that zone. This will ensure that inflow risks are properly understood, and that the necessary safeguards can be put in place ahead of time.

In addition, the drilling of two dedicated monitoring boreholes one upstream and one downstream of Area 3 prior to commencing with the expansion is recommended. These will assist in:

- Identifying any geological structures or preferential pathways intersecting the pit that could link to other water-bearing zones, whether from adjacent flooded workings or natural aquifers

- Confirming whether any connected water sources exist that could influence pit stability with underground workings, dewatering demand, or long-term water quality.

- Providing baseline and ongoing data to manage potential pollution risks associated with both open pit and underground activities.

- To finalize these mitigation measures and integrate them properly into the mine's water management strategy, the geohydrologist also requires updated and more detailed mining plans for both Area 3 and the future long term planned underground and the open pit phases, particularly around the planned interface points.

Terrestrial and Aquatic Biodiversity, Plant and Animal Species and Soils and Agricultural Potential Compliance Statements – The Biodiversity Company.

The PAOI exists in a severely degraded state owing to the active mining operations occurring in the area, as well as the surrounding agricultural practices. The natural habitats within the PAOI experience severe and ongoing anthropogenic disturbance which has resulted in their inability to recover to a more functional state. As a result, much of the functionality has been lost and without active human intervention and rehabilitation, these habitats will continue to degrade and are unlikely to recover. Due to the degradation, modification and the fragmented state and small size of the habitats, they do not provide suitable habitat for fauna or flora SCC. It is unlikely that any of these habitats are representative of a CBA, and many of the areas classified as an ESA have already been modified. The Degraded Thornveld habitat is assigned a 'Low' sensitivity and the Modified habitat a 'Very Low' sensitivity.

Based on the site verification, no wetlands, drainage lines, or natural aquatic features occur within or adjacent to the development footprint. The area is highly modified and of low aquatic biodiversity sensitivity; therefore, no further functional or impact assessment is required in accordance with the Aquatic Biodiversity Protocol (GN 320 of 20 March 2020).

The baseline soil findings, current land uses and the calculated land potential dispute the agricultural theme in areas associated with sensitivities ranging from "Very Low to Low", "Low-Moderate" and "Moderate" land capability sensitivities within the project area. They further concur to an extent with "Very Low to Low" and "Low-Moderate" land capability sensitive within the 50 m buffer area of the proposed development. The overall site sensitivity of the project area ranges from 'Low' to 'Medium'.

The ecological integrity, importance and functioning of these terrestrial biodiversity areas is at risk. The rehabilitation and preservation of these systems is the most important aspect to consider for the proposed project.

The location, state and size of the ecosystem suggests that it is unlikely that any functional habitat or SCCs will be lost as a result of the impacts arising from the proposed activities. However, these assumptions pertain to the terrestrial habitat only and the recommendations and mitigations presented in the accompanying wetland sections must be strictly adhered to.

It is the opinion of the specialist that the proposed development is favourable only if all mitigation measures provided in this and other specialist reports are implemented, as well as the following:

- An alien invasion plant (AIP) management plan must be compiled and implemented for the entire PAOI;

- A rehabilitation plan must be compiled and implemented for the entire PAOI;

- A dust management plan must be compiled and implemented for the entire PAOI; and

- A site walkdown and a protected flora walkdown must be conducted during the correct flowering season (between October and March following sufficient rainfall to prompt flowering) prior to the commencement of development activities and all protected flora species must be avoided or the relevant permits must be obtained for activities which may result in the need to translocate, cut/damage, and/or destroy specimens.

Heritage Impact Assessment (HIA) – PGS Heritage.

The HIA identified various heritage resources within the study area including archaeological resources which are rated as having a high heritage significance and will require further mitigation work before the project can continue. It should be noted that the study was conducted for a larger area of which Area 3 was a part of. The study identified heritage resources, mostly forming part of a larger Late Iron Age (LIA) occupation of the koppie and consist of both varying density pottery scatters graded as IIIB/IIIC to NCW and LIA walling graded as IIIB.

Previous studies in the footprint have also identified various other heritage resources including: 2 cemeteries/graveyards, historical infrastructure, a historical homestead, a past community settlement, an ungraded heritage site, Middle Stone Age (MSA) stone tool scatters and further LIA occupation of the koppie located adjacent the study area. Desktop analysis further highlighted the greater extent of LIA walling around the koppie and fieldwork has indicated that further LIA walling is present at/near the koppie despite not being visible on satellite imagery (within Area 3).

During the impact assessment phase, the heritage data collected during the fieldwork was evaluated according to the heritage significance methodology and impact assessment methodology to determine the potential impacts of the proposed layout on the heritage resources.

Mitigation and management measures were provided. These recommendations must be incorporated into the Environmental Management Programme (EMPr) for approval by the competent authority.

It is the combined considered opinion of the heritage specialists that the proposed project will have a direct impact on several identified heritage resources rated being of low to high heritage significance. With the implementation of recommended mitigation measures the overall impact on heritage resources will be reduced to acceptable levels during the activities of the project.

Each of the identified risks and impacts at the various project phases were assessed. The assessment criteria include the nature, extent, duration, magnitude / intensity, reversibility, probability, public response, cumulative impact, and irreplaceable loss of resources.

A summary of the key findings of the environmental impact assessment as undertaken in this BAR is outlined below:

- The majority of the negative impacts had a medium-high rating prior to mitigation, which were then decreased to medium-low post-mitigation and final significance rating scenario.
- The proposed expansion of the existing opencast pit at the mine has the potential to impact negatively on the surrounding environment. However, the impact assessment conducted by the EAP and specialists concluded that the foreseeable impacts can be mitigated to acceptable levels through the implementation of the proposed mitigation measures.
- Air Quality will only be impacted on slightly and will still fall within all the acceptable levels.
- Ambient noise will only be impacted on slightly and will still fall within all the acceptable levels.
- The groundwater quality and quantity will be impacted on, however, if mitigation measures are implemented as recommended by the specialist this can be managed to acceptable levels.
- No aquatic resources or biodiversity have been identified by the specialist within or adjacent to the study area.
- Terrestrial biodiversity, plant and animal species and potential SCC will be impacted by the development. However, the specialist is of the opinion that the activity may proceed, provided that the mitigation measures be implemented.
- Heritage resources will be impact by the development. However, the specialist is of the opinion that the activity may proceed, provided that the mitigation measures be implemented.

- Consultation with the community and landowners will be conducted in order to capture any comments or concerns regarding the proposed activities and to ensure the community and landowners are kept informed and allowed to raise issues. The concerns raised will be included in the final BAR.

The proposed expansion of the opencast pit will have some positive impacts (need and desirability) i.e. extending employment opportunities at the mine and in turn have a positive impact on the continued economy of the area. This was calculated to have a high positive final significance. Several negative direct and indirect impacts have also been identified, that may result from the expansion, such as reduced air quality, ground water impacts, sensitive habitat impacts etc. These impacts ranges from short to long term and were mostly rated as medium-low and low for a final significance, with only three impacts with a medium-high final significance, which includes:

- Air pollution as a result from dust generation activities (i.e. blasting, hauling, crushing, and stockpiling) during the operational phase;
- Clearing of vegetation leading to soil erosion and loss of topsoil; and
- Ongoing habitat destruction and disturbance to fauna from noise, dust, and artificial lighting.

It should be noted that this is only and expansion of existing mining and will therefore not have a significant increase in the existing impacts of mining in the area.

The implementation of the proposed mitigation measures will ensure that the negative implications and risks of the project are reduce. The positive impacts may be increased by putting in place certain measures as recommended. Appropriate mechanisms for avoidance and mitigation of these negative impacts are included in the EMPr. The potential negative impacts are described in Section 8.3.

The impacts on the environment can be mitigated through open communication with the community, landowners, and implementation of the proposed EMPr mitigation measures. It is, therefore, the opinion of the EAP and appointed specialists that the proposed activity should be authorised as long as the proposed mitigation measures are implemented. This will ensure continued employment of the existing workforce.

1 INTRODUCTION

Environmental Impact Management Services (Pty) Ltd (EIMS) has been appointed as the Environmental Assessment Practitioner (EAP) for Rustenburg Chrome Mining (Pty) Ltd (RCM). EIMS will manage the environmental authorisation and consultation process for the proposed expansion of the existing opencast pit by approximately 16 Ha, at RCM's existing mining operations near Kroondal in the Rustenburg Local Municipality, North West Province.

The applicant owns and operates the RCM underground and opencast chrome mining operations and has two mining rights: NW30/5/1/2/2/336 MR and NW30/5/1/2/2/274 MR.

In 2015, the mine submitted and was granted an amendment to its existing Mining Right (NW30/5/1/2/2/336 MR) and Environmental Authorisation (EA) to the Department of Mineral Resources (DMR). The update included the proposed open pit operation within the mining right area as well as the extension of the underground operations as part of a transfer of rights with neighbouring mines. This amendment was made in accordance with the provisions of Section 102 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA), and did not include listed and waste management activities. It was understood that the applications were made prior to the National Environmental Management Act, 1998 (Act No. 107 of 1998) coming into effect. In 2017, Lanxess Chrome Mine (LCM) (now RCM) submitted and was granted and Integrated Environmental Authorisation (EA) application in terms of NEMA and a Waste Management License (WML) application in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEMWA) for the listed activities in both Acts and associated regulations. (Ref No. NW30/5/1/2/3/2/1/336EM). An Integrated Water Use License (IWUL) Licence No. 07/A22H/ACIGJ/9460), was also applied for and granted in 2020, by the Department of Water and Sanitation (DWS) for all the water uses listed in terms of Section 21 of the National Water Act, 1998 (Act No. 36 of 1998) (NWA).

This application was submitted to the Department of Mineral and Petroleum Resources (DMPR), for the proposed expansion of the opencast pit by approximately 16 Ha. No other new infrastructure is applied for in this application.

1.1 REPORT STRUCTURE

This report has been compiled in accordance with the NEMA EIA Regulations, 2014, as amended. A summary of the report structure, and the specific sections of the report that correspond to the applicable regulations, is provided in Table 1 below.

Table 1: Report Structure

Environmental Regulation NEMA EIA Regulations, 2014	Description	Section in Report
Appendix 1(3)(1)(a):	details of- (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;	Section 1 and Appendix A.
Appendix 1(3)(1)(b):	the location of the activity, including: (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Section 1.3
Appendix 1(3)(1)(c):	a plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale; or, if it is- (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Section 1.3
Appendix 1(3)(1)(d):	a description of the scope of the proposed activity, including-	Section 2

Environmental Regulation NEMA EIA Regulations, 2014	Description	Section in Report
	(i) all listed and specified activities triggered and being applied for; and (ii) a description of the activities to be undertaken including associated structures and infrastructure-	
Appendix 1(3)(1)(e):	a description of the policy and legislative context within which the development is proposed including- (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	Section 3
Appendix 1(3)(1)(f):	a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Section 3
Appendix 1(3)(1)(g):	a motivation for the preferred site, activity and technology alternative;	Section 5
Appendix 1(3)(1)(h):	a full description of the process followed to reach the proposed preferred alternative within the site, including- (i) details of all the alternatives considered; (ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; (iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage, and cultural aspects;	Section 5 Section 6 Section 7

Environmental Regulation NEMA EIA Regulations, 2014	Description	Section in Report
	(v) the impacts and risks identified for each alternative including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which these impacts – aa) can be reversed; bb) may cause irreplaceable loss of resources; and cc) can be avoided, managed, or mitigated; (vi) the methodology used in determining and ranking the nature, significance, consequences, extent duration and probability of potential environmental impacts and risks associated with the alternatives; (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological social, economic, heritage and cultural aspects; (viii) the possible mitigation measures that could be applied and level of residual risk; (ix) the outcome of the site selection matrix; (x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and (xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	Section 8
Appendix 1(3)(1)(i):	a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including- (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and	Section 8

Environmental Regulation NEMA EIA Regulations, 2014	Description	Section in Report
	(ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	
Appendix 1(3)(1)(j):	an assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated;	Section 8 and Appendix G
Appendix 1(3)(1)(k):	where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Section 8.5.
Appendix 1(3)(1)(l):	an environmental impact statement which contains- (i) a summary of the key findings of the environmental impact assessment; (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	Section 9

Environmental Regulation NEMA EIA Regulations, 2014	Description	Section in Report
Appendix 1(3)(1)(m):	based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr;	Section 10
Appendix 1(3)(1)(n):	any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Section 11
Appendix 1(3)(1)(o):	a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 13
Appendix 1(3)(1)(p):	a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Section 14
Appendix 1(3)(1)(q):	where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	Section 15
Appendix 1(3)(1)(r):	an undertaking under oath or affirmation by the EAP in relation to- (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties; and	Section 16
Appendix 1(3)(1)(t):	any specific information that may be required by the competent authority; and	None
Appendix 1(3)(1)(u):	any other matters required in terms of section 24(4)(a) and (b) of the Act.	None

1.2 DETAILS OF THE EAP

EIMS has been appointed as the independent EAP and to assist in preparing and submitting the EA application and Basic Assessment Report, and undertaking a Public Participation Process (PPP) in support of the proposed project. The details of the EIMS consultant and EAPs who compiled this Report are indicated in Table 2.

In terms of Regulation 13 of the EIA Regulations, 2014, as amended, an independent EAP, must be appointed by the applicant to manage the application. EIMS is compliant with the definition of an EAP as defined in Regulations 1 and 13 of the EIA Regulations, as well as Section 1 of the NEMA. This includes, *inter alia*, the requirement that EIMS is:

- Objective and independent;
- Has expertise in conducting EIAs;
- Comply with the NEMA, the environmental regulations and all other applicable legislation;
- Considers all relevant factors relating to the application; and
- Provides full disclosure to the applicant and the relevant environmental authority.

EIMS is a private and independent environmental management consulting firm that was founded in 1993. EIMS has in excess of 32 years' experience in conducting EIAs, including many EIAs for mines and mining related projects. Please refer to the EIMS website (www.eims.co.za) for company details and examples of EIA documentation currently available.

This Basic Assessment Report was prepared by Vukosi Mabunda and Monica Niehof, Registered EAPs employed by EIMS. Their CVs are included in of this report.

Table 2: Details of the Environmental Assessment Practitioners

Role:	**Senior EAP- report compilation and review**	**Senior EAP- report compilation**
Name:	Monica Niehof	Mr. Vukosi Mabunda
Tel No:	+27 11 789 7170	
Fax No:	+27 86 571 9047	
Qualifications and experience	BSc Hons Environmental Management 13 years consulting experience	MSc Geography 7 years consulting experience
Professional Registrations:	Registered Environmental Assessment Practitioner with Environmental Assessment Practitioner Association of South Africa – EAPASA (Reg. No: 2024/8835).	Registered Environmental Assessment Practitioner with Environmental Assessment Practitioner Association of South Africa – EAPASA (Reg. No: 2019/867) Professional Natural Scientist with the South African Council for Natural Scientific Professions – SACNASP (Reg. No: 134178).

1.3 LOCATION OF THE OVERALL ACTIVITY

Table 3 below provides details on the properties that fall within the EA Application Area. The proposed application area is located across two farm portions for which EA is required. Refer to Figure 1 below for the locality map for the proposed activity.

Table 3: Locality Details

Property	**RCM is situated 7km east of Kroondal and 11km south-east of Rustenburg, within the Rustenburg Local Municipality. The RCM has been operational since 1958.**			
Property Name, 21-digit Surveyor General Code and Ownership	Farm Name	Portion	LPI Code	Ownership Type
	Rietfontein 338 JQ	1	T0JQ00000000033800001	Private Company
	Klipfontein 300 JQ	RE/2	T0JQ00000000030000002	Government
Application Area (Ha)	~ 16Ha			
Magisterial District	Bojanala Platinum District Municipality			
Distance and direction from nearest towns	~7 Km East of Kroondal			
Surrounding land uses	Mining, Agriculture, National Road, Individual homesteads and other residential.			

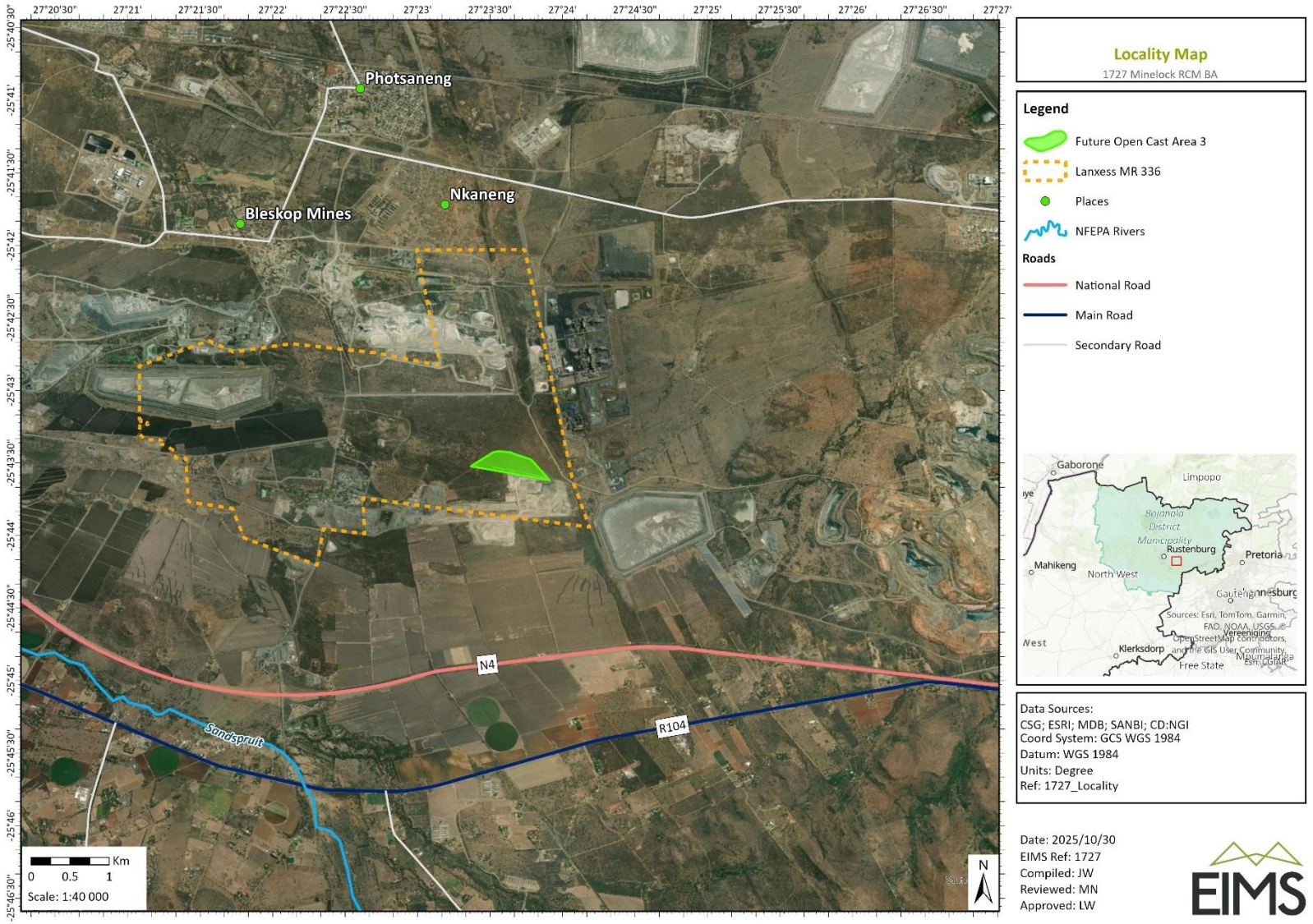


Figure 1: Locality Map for RCM Opencast Pit 3

2 SCOPE OF THE PROPOSED ACTIVITY

This section provides a detailed description for the proposed project. Most of the key information presented in this chapter was obtained from the applicant. The aim of the project description is to describe the proposed activities planned to take place at the RCM study area. Furthermore, the project description is designed to facilitate the understanding of the proposed project related activities which are anticipated to lead to the potential impacts identified and assessed in this BAR, and for which management measures have been designed.

2.1 OVERVIEW OF PROPOSED ACTIVITIES

The study area falls within the Rustenburg Local Municipality Ward 33, Rustenburg Local Municipality (Bojanala District Municipality) administrative area. Refer to Table 3 above for the property descriptions.

The Applicant owns and operates the Rustenburg Chrome Mine and intends expanding the opencast pit that has not previously been authorised.

The current operations at RCM include *inter alia*:

- Underground mining operations;
- Opencast mining area;
- Rehabilitated Pepsi Dam, Lined Dam, 2 x existing Pollution Control Dams (PCDs);
- Tailings Storage Facility (TSF);
- Waste Rock Dump (WRD);
- Gravity plant area; and
- Heavy Medium Separation (HMS) plan.

The new activity that is being applied for as part of this application and that will be assessed in this report is limited to the expansion of the existing opencast pit to the north (Area 3), which is approximately 16 ha in extent. This new area will be a contiguous and a continuous extension to the current open cast pit and the continuation of the existing open cast mining operations. The proposed expansion area is located within MR 336. Access to the resource will be by an opencast cut 1374m in strike length and down to a vertical depth of 127 m below surface. The ore production rate is estimated to be 89 000 tons per month (approximately 1 086 000 tons per annum) with a Life of Mine (LoM) of 5 years for the expanded open pit area.

Concurrent roll-over mining will be implemented. As the opencast mining progresses, the voids created will be backfilled with overburden from the progressive opencast mining, and then overlain by the various soil horizons and rehabilitated. The design of the highwall has been adapted to fit the topography. The overall highwall angle is 60°. The highwall designs will be shown as part of the amended mine works programme.

There will be free digging up to ±14 metres below ground surface (mbgs) where after open pit blasting operations will take over, mining 100 m x 300 m block sizes at 10 m cuts, utilising the Load-Haul-Dump, or LHD method, with excavators and dump trucks. The open pit mining sequence will start on the eastern side of the proposed pit area and progress towards the west. The final void area will be at the western extent of the open pit. Waste rock and topsoil will be stockpiled separately to the south of the open pit area. As the open pit mining progresses, the voids created will be backfilled with overburden from the progressive open pit mining, and then overlain by the various soil horizons and rehabilitated. The design of the highwall has been adapted to fit the topography with an angle of 60°.

In order to access the ore the topsoil and subsoils will be stripped and placed on a stockpile for the first cut. The inter burden will similarly be placed on a stockpile to allow the ore to be extracted. Inter burden from cut 2 onwards will be used to backfill the previous cut, while soil and subsoil from cut 3 onwards will be used to rehabilitate previously filled cuts. At the end of the life of mine the material from cut 1 will be used to fill the final void with the subsoil and topsoil from these areas will be placed as final cover over the area remaining.

2.2 LISTED AND SPECIFIED ACTIVITIES

In terms of Section 24(2) of NEMA, the Minister and/or any MEC in concurrence with the Minister may identify activities which require authorisation as these activities may negatively affect the environment. Environmental Impact Assessment (EIA) Regulations were promulgated in 2014 and amended in 2017 and 2021 in terms of Section 24(5) and Section 44 of the National Environmental Management Act (NEMA), Act 107 of 1998 and consist of the following:

- *Regulation 982* provides details on the processes and procedures to be followed when undertaking an Environmental Authorisation process (also referred to as the EIA Regulations);
- *Listing Notice 1* (Regulation 983, as amended) defines activities which will trigger the need for a Basic Assessment process;
- *Listing Notice 2* (Regulation 984, as amended) defines activities which trigger an Environmental Impact Assessment (EIA) process. If activities from both R 983 and R 984 are triggered, then a scoping and EIA process will be required; and
- *Listing Notice 3* (Regulations 985, as amended) defines certain additional listed activities for which a Basic Assessment process would be required within identified geographical areas. (Refer to Figure 41).

The above regulations and listing notices were assessed to determine whether the proposed project will trigger any of the above listed activities, and if so, which Environmental Authorisation Process would be required. The triggered listed activities are presented in Table 4. The applicant will require an Environmental Authorisation (EA) in terms of GNR 983 Listing Notice 1 and GNR 985 Listing Notice 3 of the NEMA EIA Regulations 2014 as amended. Therefore, a Basic Assessment process is required in line with all the requirements of the NEMA EIA Regulations, 2014, as amended.

Table 4: Listed and Specified Activities

Activity No(s):	Activity	Portion of the proposed project to which the applicable listed activity relates.
GNR 983 Listing notice 1		
Activity 21D	Any activity including the operation of that activity which requires an amendment or variation to a right or permit in terms of section 102 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity contained in this Listing Notice or in Listing Notice 3 of 2014, required for such amendment. [Activity 21D inserted by GN 517/2021].	Amending the MR, Mine Works Programme (MWP), EMPr through Section 102.
Activity 27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	Clearance of indigenous vegetation for expanded open cast pit.
GNR 985 Listing Notice 3		

Activity No(s):	Activity	Portion of the proposed project to which the applicable listed activity relates.
Activity 12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.	Clearance of indigenous vegetation for expanded open cast pit, within a Critical Biodiversity Area (CBA) 2. (Refer to Figure 41).

3 NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES

The need and desirability analysis component of the "Guideline on need and desirability in terms of the EIA Regulations (Notice 819 of 2014)" includes, but is not limited to, describing the linkages and dependencies between human well-being, livelihoods and ecosystem services applicable to the area in question, and how the proposed development's ecological impacts will result in socio-economic impacts (e.g., on livelihoods, loss of heritage site, opportunity costs, etc.). This section of the report provides the need and desirability for the proposed project.

The overall need for the proposed opencast pit expansion is largely due to the urgent requirement for additional mining areas to continue with mining operations. If the project was to not proceed, it would entail a situation where mining activities would come to a halt. That would negatively affect the future viability of RCM'S mining operations and considerable socio-economic impacts would emanate due to a lack of approved mining areas. This would also negatively affect the company's financial closure and rehabilitation plans. Subsequently, it would result in a significant negative financial impact on not only RCM, but also have a direct negative impact on the workforce on the mine and surrounding businesses and communities that are directly or indirectly linked to the operations. Table 5 presents the need and desirability analysis undertaken for the project.

Table 5: Need and desirability analysis for the proposed project

Ref No.	Question	Answer
1	Securing ecological sustainable development and use of natural resources	
1.1	How were the ecological integrity considerations taken into account in terms of: Threatened Ecosystems, Sensitive and vulnerable ecosystems, Critical Biodiversity Areas, Ecological Support Systems, Conservation Targets, Ecological drivers of the ecosystem, Environmental Management Framework, Spatial Development Framework (SDF) and global and international responsibilities.	A number of specialist studies will inform this application and include: • Agriculture Potential, Soils and Land Capability Compliance Statement; • Geohydrology Impact Study; • Aquatic and Wetland Compliance Statement; • Terrestrial Biodiversity Compliance Statement; and • Cultural Resources and Archaeological Impact Assessment; and • Paleontological Desktop Impact Assessment. Refer to Appendix F for the attached specialist studies and to the baseline conditions in Section 7 and impact assessment information in Section 8 of this report.
1.2	How will this project disturb or enhance ecosystems and / or result in the loss or protection of biological diversity? What measures were explored to avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	Refer to the baseline conditions in Section 7 and impact assessment information in Section 8 of this report.
1.3	How will this development pollute and / or degrade the biophysical environment? What measures were explored to either avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	

Ref No.	Question	Answer
1.4	What waste will be generated by this development? What measures were explored to avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and / or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	No additional waste will be generated as result of the proposed activity, apart from the waste rock itself. The expansion of the opencast pit will not increase or change waste generation or mitigation at the mine. The current EMPr contains sufficient measures to deal with waste currently. The mine has a Waste Management License (WML) in place to deal with additional waste rock and waste rock may also be used to backfill the voids.
1.5	How will this project disturb or enhance landscapes and / or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	A heritage (cultural and archaeology) impact assessment was conducted as part of this project. Refer to Section 7.11 for baseline information and to Section 8 for identified impacts and assessment of the impacts.
1.6	How will this project use and / or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	Refer to the impact assessment in Section 8 of this report. As a result of the fact that this project entails only a slight increase in the scope of existing mining activities, it is anticipated that this project will not lead to a significant impact or depletion of non-renewable resources, as long as all the potential impacts are thoroughly assessed and appropriate mitigation measures are implemented as indicated in this report and in the EMPr attached as Appendix H.
1.7	How will this project use and / or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and / or impacts on the ecosystem jeopardise the integrity of the resource and / or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?	Refer to the impact assessment in Section 8 of this report. As a result of the fact that this project entails only a slight increase in the scope of existing mining activities, it is anticipated that this project will not lead to a significant impact on renewable resources, as long as all the potential impacts are thoroughly assessed and appropriate mitigation measures are implemented as indicated in this report and in the EMPr attached as Appendix H.

Ref No.	Question	Answer
1.7.1	Does the proposed project exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e., de-materialised growth)?	The proposed project is only to allow for the continuation of mining at the existing mine operations and within an existing mining right area and is not a new mine.
1.7.2	Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used?	The proposed project will not, at this stage, involve the use of the natural resources apart from the expanded opencast area to be cleared. Specialist studies and an impact assessment was conducted during to assess the impacts on the biophysical and socio-economic environment. Refer to Section 8 for the assessment. The area contains degraded Marikana Thornveld type vegetation, which will be lost, but is surrounded by mining activities and located within an existing approved mining right area. It should also be noted that the area falls within the Magaliesberg Biosphere / Buffer Area. The Magaliesberg Biosphere Management has been included in the Interested and Affected Parties Database and were notified of the proposed expansion.
1.7.3	Do the proposed location, type and scale of development promote a reduced dependency on resources?	The proposed project is only to allow for the continuation of mining at the existing mine operations and within an existing mining right area and is not a new mine and will, therefore not increase any dependency on resources, it will only extend the use and volume of current resources. It should also be noted that the proposed expansion area is located within an existing approved Mining Right area.
1.8	How were a risk-averse and cautious approach applied in terms of ecological impacts:	
1.8.1	What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	The limitations and/or gaps in knowledge are presented in Section 13.
1.8.2	What is the level of risk associated with the limits of current knowledge?	The level of risk is considered low at this stage.

Ref No.	Question	Answer
1.8.3	Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	At this stage it is anticipated that this project will not lead to a significant impact on the receiving environment. Refer to the impact assessment in Section 8 of this report.
1.9	How will the ecological impacts resulting from this development impact on people's environmental right in terms of the following?	
1.9.1	Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	The proposed activities are anticipated to have low negative ecological impacts. Refer to the impact assessment in Section 8 in this report.
1.9.2	Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	
1.10	Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	A medium to low impact on third party wellbeing, livelihoods and ecosystem services is currently foreseen. Refer to the impact assessment in Section 8 of this report.
1.11	Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives / targets / considerations of the area?	The proposed activities are anticipated to have generally low negative ecological impacts. Refer to the impact assessment in Section 8 in this report.
1.12	Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?	Refer to Section 5 – where details of the alternatives are given and considered.

Ref No.	Question	Answer
1.13	Describe the positive and negative cumulative ecological / biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?	Refer to Section 8 of this report.
2	Promoting justifiable economic and social development	
2.1	What is the socio-economic context of the area, based on, amongst other considerations, the following:	
2.1.1	The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks or policies applicable to the area.	Refer to Section 7.10 of this report for a breakdown of the demographics and social environment in the study area. The Rustenburg IDP identifies a diversified economic growth, vibrant rural development and job creation as one of the key mayoral strategic priorities (IDP 2022-2027 and 2025/26 IDP Review).
2.1.2	Spatial priorities and desired spatial patterns (e.g., need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),	It is not anticipated that the mine will need additional labour for the expansion of the opencast pit. If it is required, the use of local labour will be utilised as far as possible. Labourers will mostly be sourced from surrounding towns and areas such as Rustenburg. The North West Province Spatial Development Framework, 2016, identifies mining and construction as economic sectors of growth and opportunity within the province that should be targeted. It should also be noted that the mining area for expansion is located within an existing approved mining right area and is surrounded by mostly other mining activities. The proposed activity will, therefore, not contribute to urban or industrial sprawl.
2.1.3	Spatial characteristics (e.g., existing land uses, planned land uses, cultural landscapes, etc.), and	Refer to the baseline environment in Section 7 of this report. The proposed activities and infrastructure are located in a mining area and is surrounded by existing mining infrastructure. There are, however, some cultural heritage sites in the near vicinity of the expansion area. A heritage impact assessment has been conducted and concluded that the impact on these features is

Ref No.	Question	Answer
		minimal, provided that all the mitigation measures in the report and in the EMPr are implemented and strictly enforced and monitored. Refer to Section 8 and Appendix H.
2.1.4	Municipal Economic Development Strategy ("LED Strategy").	Considering the location and type of the activities, it is not anticipated to significantly promote or facilitate spatial transformation and will contribute to sustainable urban development.
2.2	Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?	Refer to the impact assessment in Section 8 in this report, specifically Section 0. The impact will mainly be positive in that it will allow for the continuation of mining, which will lead to the retaining of a significant number of jobs at the mine, and will continue to provide and stimulate the local and provincial economy.
2.2.1	Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?	It is not anticipated that the mine will need additional labour for the expansion of the opencast pit. If it is required, the use of local labour will be utilised as far as possible. Labourers will mostly be sourced from surrounding towns and areas such as Rustenburg. The North West Province Spatial Development Framework, 2016, identifies mining and construction as economic sectors of growth and opportunity within the province that should be targeted. It should also be noted that the mining area for expansion is located within an existing approved mining right area and is surrounded by mostly other mining activities. The proposed activity will, therefore, not contribute to urban or industrial sprawl. In addition, the Applicant has various social and LED initiatives required under their Social & Labour Plan (SLP) commitments.
2.3	How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	During the public participation process feedback from the relevant communities will be obtained. Refer to Section 6.

Ref No.	Question	Answer
2.4	Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?	Refer to the impact assessment and mitigation measures in Section 8 of this report. The activity will allow the continuation of existing employment and ensure the Applicant can continue to employ current employees at their mine operations.
2.5	In terms of location, describe how the placement of the proposed development will:	
2.5.1	Result in the creation of residential and employment opportunities in close proximity to or integrated with each other;	It is not anticipated that the mine will need additional labour for the expansion of the opencast pit. If it is required, the use of local labour will be utilised as far as possible. Labourers will mostly be sourced from surrounding towns and areas such as Rustenburg.
2.5.2	Reduce the need for transport of people and goods;	The activities are not anticipated to have an impact on the transportation of goods and people. The expansion will ensure the status quo.
2.5.3	Result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms of public transport);	The activities are not anticipated to have any significant impact on the public transport, it will ensure the status quo.
2.5.4	Compliment other uses in the area;	The surrounding area is mainly impacted by existing mining activities and associated infrastructure.
2.5.5	Be in line with the planning for the area;	Refer to item 2.1.1 of this table (above).
2.5.6	For urban related development, make use of underutilised land available with the urban edge;	Not applicable. The proposed project is not located in an urban area. The area of expansion is, however, located in close proximity to existing mining areas and within and existing approved mining right area close to existing infrastructure and processing and other supportive infrastructure.
2.5.7	Optimise the use of existing resources and infrastructure;	Refer to Section 2.1 of this report and to the 2.5.6 above.

Ref No.	Question	Answer
2.5.8	Opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g., not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement);	Not applicable, the proposed expansion will not make use of bulk infrastructure.
2.5.9	Discourage "urban sprawl" and contribute to compaction / densification;	Not applicable. The proposed project is not located within an urban area and will not contribute to urban sprawl.
2.5.10	Contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs;	Refer to items 2.5.7 – 2.5.9 of this table (above).
2.5.11	Encourage environmentally sustainable land development practices and processes;	Refer to impact assessment in Section 8 of this report.
2.5.12	Take into account special locational factors that might favour the specific location (e.g., the location of a strategic mineral resource, access to the port, access to rail, etc.);	Refer to alternative analysis in Section 5.
2.5.13	The investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential);	It is not anticipated that the mine will need additional labour for the expansion of the opencast pit. If it is required, the use of local labour will be utilised as far as possible. Labourers will mostly be sourced from surrounding towns and areas such as Rustenburg. In addition, Applicant has various social and LED initiatives required under their various SLP commitments.
2.5.14	Impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area; and	Refer to impact assessment in Section 8 of this report.
2.5.15	In terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?	Given the scale of the development it is not anticipated that the activities will contribute significantly to settlements or areas in terms of direct socio-economic returns, however, the development will allow mining operations at the mine to continue.

Ref No.	Question	Answer
2.6	How was a risk-averse and cautious approach applied in terms of socio-economic impacts:	
2.6.1	What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	Refer to Section 13 of this report.
2.6.2	What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?	The level of risk is low as the project is not expected to have far reaching negative impacts on socio-economic conditions.
2.6.3	Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	The level of risk is low as the project is not expected to have far reaching negative impacts on socio-economic conditions.
2.7	How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:	
2.7.1	Negative impacts: e.g., health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	Refer to the impact assessment in Section 8 of this report. The proposed activity is not expected to have any additional impacts, only the continuation of current impacts and if managed and monitored appropriately the impacts are low.
2.7.2	Positive impacts. What measures were taken to enhance positive impacts?	
2.8	Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socioeconomic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	
2.9	What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	
2.10	What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged	

Ref No.	Question	Answer
	persons (who are the beneficiaries and is the development located appropriately)? Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?	
2.11	What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?	By conducting a BA Process, the applicant ensures that equitable access has been considered. Refer to the public participation process in Section 6 and impact assessment in Section 8 of this report.
2.12	What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	Refer to the impact assessment in Section 8 of this report. The EMPr which is attached as Appendix H, specifies phases of the development and timeframes within which mitigation measures must be implemented.
2.13	What measures were taken to:	
2.13.1	Ensure the participation of all interested and affected parties;	Refer to Section 6 of this report, describing the public participation process undertaken for the proposed project.
2.13.2	Provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation;	Refer to Section 6 of this report, describing the public participation process undertaken for the proposed project. advertisement, notification letter and site notice have been made available in English, Afrikaans and Setswana to assist in understanding of the project.
2.13.3	Ensure participation by vulnerable and disadvantaged persons;	
2.13.4	Promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means;	
2.13.5	Ensure openness and transparency, and access to information in terms of the process;	

Ref No.	Question	Answer
2.13.6	Ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge;	
2.13.7	Ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein will be promoted?	
2.14	Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	Refer to Section 6 of this report, describing the public participation process undertaken for the proposed project.
2.15	What measures have been taken to ensure that current and / or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	Potential future workers and current workers will have to be educated on a regular basis as to the environmental and safety risks that may occur within their work environment. Furthermore, adequate measures will have to be taken to ensure that the appropriate Personal Protective Equipment (PPE) is issued to workers based on the conditions that they work in and the requirements of their job. Refer to Appendix H for the EMPr, which contains measures for Environmental Awareness Training and requirements in terms of PPE.
2.16	Describe how the development will impact on job creation in terms of, amongst other aspects:	
2.16.1	The number of temporary versus permanent jobs that will be created.	It is not anticipated that the mine will need additional labour for the expansion of the opencast pit. If it is required, the use of local labour will be utilised as far as possible. Labourers will mostly be sourced from surrounding towns and areas such as Rustenburg. In addition, Applicant has various social and LED initiatives required under their various SLP commitments.
2.16.2	Whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area).	
2.16.3	The distance from where labourers will have to travel.	

Ref No.	Question	Answer
2.16.4	The location of jobs opportunities versus the location of impacts.	
2.16.5	The opportunity costs in terms of job creation.	
2.17	What measures were taken to ensure:	
2.17.1	That there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment.	The BA Process requires governmental departments to communicate regarding any application. In addition, all relevant departments are notified at various phases of the project by the EAP.
2.17.2	That actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures.	
2.18	What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?	Refer to Section 6 of this report, describing the public participation process implemented for the application, as well Section 8 for the impact on any national estate.
2.19	Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	Refer to the impact assessment and mitigation measures in Section 8 of this report. All mitigation measures are considered to be realistic and implementable.
2.20	What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?	At this stage the proposed activities are not anticipated to produce significant pollution, environmental damage or adverse health effects in the long term as long as the proposed mitigation measures are implemented.
2.21	Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed),	Refer to Section 5, description of the process followed to reach the proposed preferred site.

Ref No.	Question	Answer
	resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?	
2.22	Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?	Refer to the impact assessment and mitigation measures in Section 8.

4 POLICY AND LEGISLATIVE CONTEXT

This section provides an overview of the governing legislation identified which may relate to the proposed project. The primary legal requirement for this project stems from the need for an EA to be granted by the competent authority, which is the DMPR, in accordance with the requirements of the NEMA EIA Regulations 2014, as amended. In addition, there are numerous other pieces of legislation governed by many acts, regulations, standards, guidelines and treaties on an international, national, provincial and local level, which should be considered in order to assess the potential applicability of these for the proposed activity. The key legislation applicable to this project is discussed in the subsections below. The contents of this report are based on a review of the information that was available at the time of the compilation of the report. The discussion in this chapter is by no means an exhaustive list of the legal obligations of the applicant in respect of environmental management for the proposed project.

4.1 APPLICABLE NATIONAL LEGISLATION

The legal framework within which the proposed project operates is governed by many Acts, Regulations, Standards and Guidelines on a national level. Legislation applicable to the project includes (but is not limited to) those discussed below.

4.1.1 CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA

The constitution of any country is the supreme law of that country. The Bill of Rights in Chapter 2 Section 24 of the Constitution of South Africa Act (Act No. 108 of 1996) makes provisions for environmental issues and declares that: *"Everyone has the right -*

a) to an environment that is not harmful to their health or well-being; and

b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:

i. prevent pollution and ecological degradation;

ii. promote conservation; and

iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development".

The State must therefore respect, protect, promote and fulfil the social, economic and environmental rights of everyone and strive to meet the basic needs of previously disadvantaged communities. The Constitution therefore recognises that the environment is a functional area of concurrent national and provincial legislative competence, and all spheres of government and all organs of state must cooperate with, consult and support one another if the State is to fulfil its constitutional mandate. The application for an Environmental Authorisation for the proposed expansion project will ensure that the environmental right enshrined in the Constitution contributes to the protection of the biophysical and social environment.

4.1.2 THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002

The Mineral and Petroleum Resources Development Act (MPRDA) aims to "make provision for equitable access to, and sustainable development of, the nation's mineral and petroleum resources". The MPRDA outlines the procedural requirements that need to be met to acquire mineral and petroleum rights in South Africa. The MPRDA further governs the sustainable utilisation of South Africa's mineral resources.

Several amendments have been made to the MPRDA. These include, but are not limited to, the amendment to Section 102 which concerns the amendment of rights, permits, programmes and plans, to requiring the written permission from the Minister for any amendment or alteration; and the Section 5A(c) requirement that landowners or land occupiers receive twenty-one (21) days' written notice prior to any activities taking place on their properties. One of the most recent amendments requires all mining related activities to follow the full

NEMA process as per the 2014 EIA Regulations, which came into effect on 4 December 2014 as was last amended in 2022.

In support of the EA application specifically, the applicant is required to conduct an environmental process comprising of the preparation of this Basic Assessment Report and an EMPr (see Appendix H), as well as undertake Interested and Affected Party (I&AP) consultations, all of which must be submitted to the DMPR for adjudication. This report has been compiled in accordance with Regulation 19 and Appendix 1 of the EIA Regulations (2014, as amended) in order to satisfy the criteria for a Basic Assessment Report (BAR). This BAR pertains to the integrated NEMA EA application for the proposed RCM project.

4.1.3 THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998

The main aim of the National Environmental Management Act, 1998 (Act 107 of 1998 – NEMA) is to provide for co-operative governance by establishing decision-making principles on matters affecting the environment. In terms of the NEMA EIA Regulations, the applicant is required to appoint an EAP to undertake the EIA process, as well as conduct the public participation process towards an application for EA. In South Africa, EIAs became a legal requirement in 1997 with the promulgation of regulations under the Environment Conservation Act (ECA). Subsequently, NEMA was passed in 1998. Section 24(2) of NEMA empowers the Minister and any MEC, with the concurrence of the Minister, to identify activities which must be considered, investigated, assessed and reported on to the competent authority responsible for granting the relevant EA. On 21 April 2006, the Minister of Environmental Affairs and Tourism (now Department of Forestry, Fisheries and the Environment – DFFE) promulgated regulations in terms of Chapter 5 of the NEMA. These regulations, in terms of the NEMA, were amended several times between 2010 and 2022. The NEMA EIA Regulations, 2014, as amended, are applicable to this project.

The objective of the EIA Regulations is to establish the procedures that must be followed in the consideration, investigation, assessment and reporting of the listed activities that are triggered by the proposed project. The purpose of these procedures is to provide the competent authority with adequate information to make informed decisions which ensure that activities which may impact negatively on the environment to an unacceptable degree are not authorised, and that activities which are authorised are undertaken in such a manner that the environmental impacts are managed to acceptable levels.

In accordance with the provisions of Sections 24(5) and Section 44 of the NEMA the Minister has published Regulations (GN R. 982) pertaining to the required process for conducting EIAs in order to apply for, and be considered for, the issuing of an EA. These EIA Regulations provide a detailed description of the EIA process to be followed when applying for EA for any listed activity (refer to Figure 2).

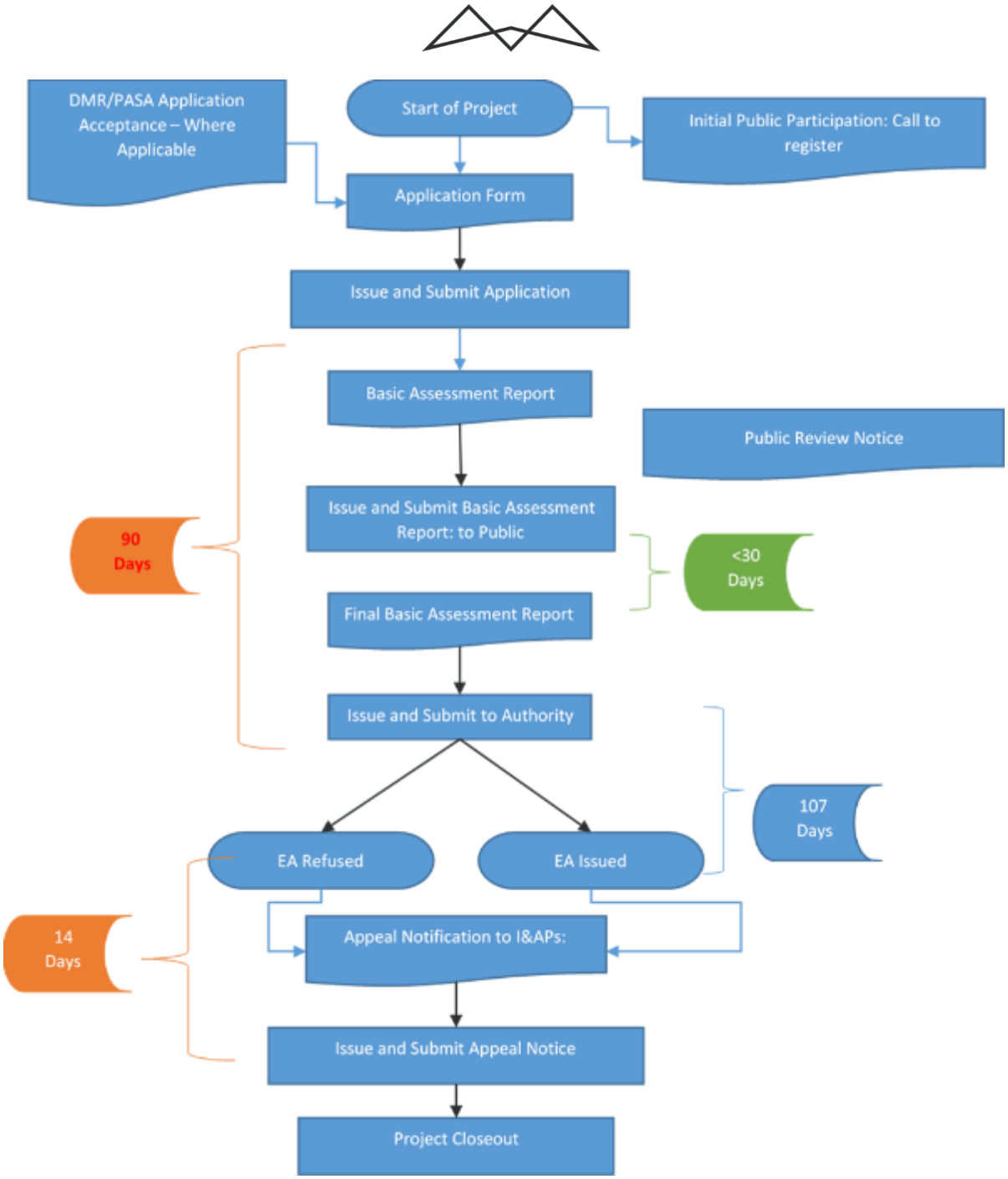


Figure 2: Basic Assessment process diagram

A Basic Assessment process is reserved for activities which have lesser potential to result in significant impacts and are less complex to assess whereas an environmental Scoping and Impact Assessment process is reserved for activities which have the potential to result in significant impacts which are complex to assess. As indicated in Section 2.2, the proposed expansion triggers a Basic Assessment Process. Figure 2 provides a graphic representation of all the components of the Basic Assessment process.

Section 24P of the NEMA requires that an applicant for an environmental authorisation relating to prospecting, mining or production must, before the Minister responsible for mineral resources issues the EA, comply with the prescribed financial provision for the rehabilitation, closure and ongoing post decommissioning management of negative environmental impacts. Therefore, the potential environmental liabilities associated with the proposed activity must be quantified and the method of financial provision indicated in line with the NEMA Financial Provision Regulations (2015). A closure plan and closure cost estimate in support of the expansion application will be undertaken. This report will address the closure measures that will be implemented and provides the cost of environmental rehabilitation at closure. The financial provisioning will be

undertaken in accordance with the 2015 National Environmental Management Act: Regulations Pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations. **The financial provisions must be submitted in support of this application (Refer to Appendix F4)**. The listed activities, the proposed project triggers, and consequently requires authorisation prior to commencement, are detailed in Section 2.2 (Table 4).

NEMA is the main Environmental Legislation in South Africa and other Specific Environmental Management Acts (SEMA's) support its objectives. Examples of SEMA's include the following:

- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008);
- National Water Act, 1998 (Act No. 36 of 1998);
- National Heritage Resources Act, 1999 (Act No. 25 of 1999);
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004); and
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004).

Some specific Environmental Management Legislation is discussed in Section 4.1. The key principles of NEMA as outlined in Chapter 3 can be summarised as follows:

- sustainability must be pursued in all developments to ensure that biophysical and socio-economic aspects are protected; or
- there must be equal access to environmental resources, services and benefits for all citizens including the disadvantaged and the vulnerable. Adverse environmental impacts shall be distributed fairly among all citizens;
- environmental governance must include the participation of all interested and affected parties who must be catered for to allow their effective participation;
- Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably; and
- The polluter pays principle must be applied in all cases where any person has caused pollution or undertaken any action that led to the degradation of the environment.

4.1.4 THE NEMA ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014 AS AMENDED

In terms of section 24(2) of NEMA, the Minister and or any MEC in concurrence with the Minister may identify activities that require authorisation as these activities may negatively affect the environment. The Act requires that in such cases the impacts must be considered, investigated and assessed before their implementation, and reported to the organ of state charged by law with authorising, permitting, or otherwise allowing the implementation of an activity. The NEMA EIA Regulations guide the processes required for the assessment of impacts of Listed Activities.

The requirement for the undertaking of Environmental Impact Assessments and Basic Assessments began in 1997 with the promulgation of the EIA Regulations under the Environment Conservation Act, 1989 (ECA) (Act No. 73 of 1989). These were followed by the 2006, 2010 and 2014 regulations. Table 6 is a summary of the progression of the EIA regulations to date.

Table 6: Summary of the South African EIA regulations from inception to date

EIA Regulations	Government Gazette
EIA Regulations promulgated in terms of the ECA, Act No 73 of 1989.	GNR 1182 & 1183: Government Gazette No 18261, 5 September 1997.

EIA Regulations	Government Gazette
Amendment of the ECA EIA Regulations.	GNR 670 and GNR 672 of 10 May 2002, Government Gazette No 23401.
2006 EIA Regulations promulgated in terms of the NEMA, Act No 107 of 1998.	GNR 385, 386 and 387 Government Gazette No 28753, Pretoria, 21 April 2006.
2010 EIA Regulations promulgated in terms of the NEMA, Act No 107 of 1998.	GNR 543, 544, 545 and 546 Government Gazette No 33306, Pretoria, 18 June 2010.
Current **2014 EIA Regulations promulgated in terms of the NEMA, Act No 107 of 1998.**	GNR 982, 983, 984 and 985 Government Gazette No 44701, Pretoria, 2015 as amended in 2017 and 2021.

4.1.5 THE NATIONAL WEB-BASED ENVIRONMENT SCREENING TOOL, 2019

On the 5th of July 2019, The Department of Forestry, Fisheries and the Environment (DFFE) issued a Notice of the requirement to submit a report generated by the National Web-based Environmental Screening Tool in terms of section 24(5)(h) of the NEMA, 1998 (Act No 107 of 1998) and Regulation 16(1)(b)(v) of the EIA regulations, 2014, as amended. The submission of this report is compulsory when applying for environmental authorisation in terms of Regulation 19 and Regulation 21 of the Environmental Impact Assessment Regulations, 2014 effective from the 4th of October 2019. The DFFE Screening Tool Report was generated on the 14th of October 2025. The Screening report is provided in Appendix E of this report. The main findings to be discussed from the screening report are listed below. The Screening Tool identified environmental sensitivities are presented in Table 7.

Table 7: Screening Tool environmental sensitivities

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Agriculture	X			
Animal species			X	
Aquatic Biodiversity				X
Archaeological and Cultural Heritage				X
Civil Aviation		X		
Defence Theme				X
Palaeontology			X	
Plant Species Theme				X
Terrestrial Ecology/ Biodiversity	X			

In this regard, a Site Sensitivity Verification Report (SSVR) has been compiled to consider the recommendations of the DFFE Screening Tool Report and to provide a rationale for the selection of specialist studies included in the assessment report (refer to Appendix E). In addition, certain specialist studies were undertaken and informed the SSVR. The findings (confirmation of disputation) per assessment theme and sensitivity ratings identified by the Screening Tool are summarized in Table 8 below.

The information collected by the specialists and EAP's assessment may be used to confirm or dispute (as may be applicable) the environmental sensitivity ratings identified by the National Screening Tool. Page 6 and 7 of 16 on

the DFFE Screening Report indicates that certain Specialist Assessments must be undertaken for the proposed development. There is however an allowance of the EAP to motivate for the reasons for not including certain assessments in the assessment report. Table 8 presents these Specialist Assessments/Studies as well as the motivations behind the EAP's decision of recommending or not recommending the undertaking of certain Specialist Assessments.

Table 8: SSVR findings and motivation for specialist assessment

Screening Tool identified specialist	Level of sensitivity	Suggested Sensitivity	Required level of assessment	Motivation
Agricultural Impact Assessment	Very High	Low-Medium	Compliance Assessment	Based on Google Earth aerial imagery, a small portion of the study area was previously used for agricultural activities until 2021 when the agricultural activities stopped and mining activities subsequently commenced. The study area is located within a mining area and will not have a direct impact on agricultural activities. Based on the Protocol for The Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Agricultural Resources (GN 320, 2020, as amended), an **Agricultural Compliance Statement is required for the application**.
Landscape/Visual Impact Assessment	N/A	Low	None	The proposed expansion of the mine is located within a mining area and is almost surrounded by other mining activities. There are also not many sensitive receptors in the area. The project and its locality do not trigger the need for this specialist study based on the triggers as identified by Oberholzer (2005) and presented in **Figure 3**. Visual sensitivities would arise from receptors living in and visiting the study area and observing changes to the aesthetic baseline, currently rated low within the context of the sub-region. Therefore, a **Landscape/Visual Impact Assessment is not required.**
Archaeological and Cultural Heritage Impact Assessment	Low	Medium	Full Impact Assessment	The National Web-Based Screening Tool Report found that the Relative Archaeological and Cultural Heritage Theme Sensitivity is *Low-Sensitive*. The protocols required that a Compliance Statement as a minimum be undertaken to verify the archaeological heritage sensitivity of the area. There are known heritage features including cemeteries and graves with potential HIGH local heritage significance based on the Relative Archaeological and Cultural Heritage sensitivity of the area and previous heritage studies in the region. In addition, the proposed activity triggers Section 38 of the National Heritage Resources Act, therefore, a **Heritage Impact Assessment is required** in terms of the Minimum Standards for Heritage Specialist Studies in terms of Section 38 of the National Heritage Resources Act (No. 25 of 1999).
Palaeontology Impact Assessment	Medium	Low	None	According to the DFFE Guidance on the Preparation of a Palaeontological Impact Assessment, Palaeontology resources are widely dispersed and can occur on any development site in South Africa. Therefore, Palaeontological Impact Assessments (PIAs) must be undertaken for

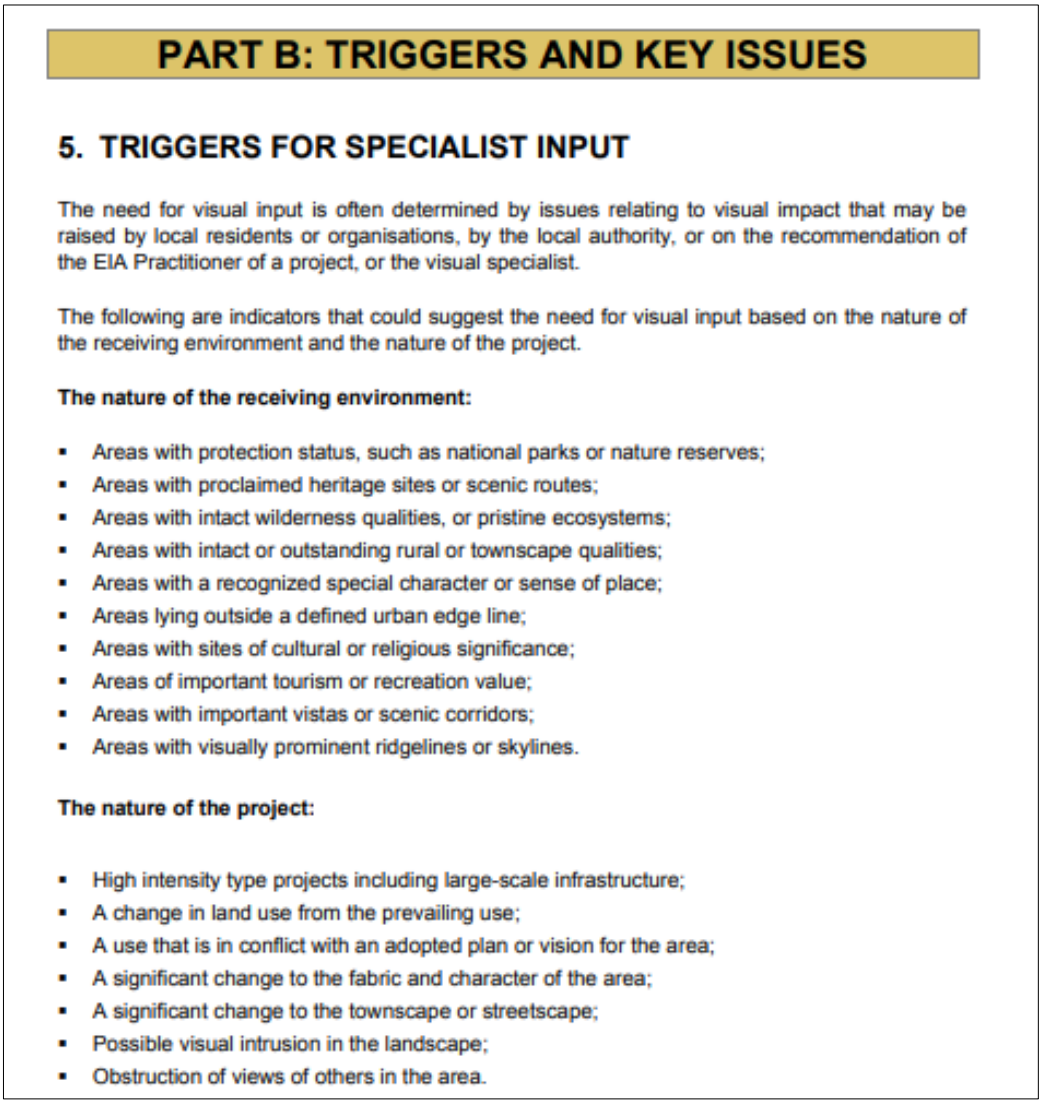
Screening Tool identified specialist	Level of sensitivity	Suggested Sensitivity	Required level of assessment	Motivation
				all developments as per the PalaeoSensitivity Map provided on SAHRIS (https://sahris.org.za/map/palaeo), irrespective of the sensitivity shown on the palaeontology theme layer. However, based on the SAHRA PalaeoSensitivity Map, the study area is located within insignificant/zero sensitivity (no palaeontological studies are required). In addition, a desktop baseline assessment of the specialist undertaken for the extensive area indicated that the sensitivity of the study area in terms of Palaeontological Resources is low. Therefore, a **Palaeontological Impact Assessment is not required**.
Terrestrial Biodiversity Impact Assessment	Very High	Low	Compliance Statement	The National Web-Based Screening Tool Report found that the Relative Terrestrial Biodiversity Impact Assessment Theme Sensitivity is *Very High-Sensitive*. Based on desktop datasets and site sensitivity verification, the study area consists of largely intact pristine vegetation. The area is considered to fall within Critical Biodiversity Areas (CBA), Ecological Support Area (ESA) and National Protected Area Expansion Strategy (NPAES) and Endangered Marikana Thornveld Ecosystem. However, the EAP, as well as the specialists visited the site prior to this application and confirmed that the sensitivity is disputed to be low. Therefore, a **Terrestrial Biodiversity Compliance Statement is required** in line with the Protocol for The Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity (GN 320, 2020 as amended) to confirm presence of Flora or Fauna, Avifauna, SCC, or protected species within the development site, verify site terrestrial biodiversity sensitivity and provide necessary mitigation measures.
Aquatic Biodiversity Impact Assessment	Low	Low	None	Based on the DFFE Screening Tool Report, there are no known watercourses within the study area. Based on the site sensitivity verification, there were no natural and artificial watercourses, wetlands and drainage lines noted within proximity of the site. Subsequently, only an **Aquatic Biodiversity Compliance Statement is required** for the project.
Hydrology Assessment	N/A	Low	None	Based on the DFFE Screening Tool Report, there are no known surface watercourses or hydrological features within the study area. Based on the site sensitivity verification, there were no natural and artificial watercourses, wetlands and drainage lines noted within proximity of the site. Subsequently, a **Hydrology Assessment is not required** for the project.

Screening Tool identified specialist	Level of sensitivity	Suggested Sensitivity	Required level of assessment	Motivation
Noise Impact Assessment	N/A	Low	None	The nature of the activities involves elevated sound levels and may have a significant acoustic output, thereby impacting nearby sensitive receptors such as fauna and homesteads or residential areas. However, as previously indicated, there are no sensitive receptors in the area. The area is predominantly mining with no residential or sensitive fauna identified. The activity will also not contribute to added noise, since it is merely continuing of existing activities and the expansion is to the north, even further away from sensitive receptors such as homesteads in the south. Therefore, a **Noise Impact Assessment is not required**.
Radioactivity Impact Assessment	N/A	Low	None	A radioactivity impact assessment is required for any activity involving radioactive materials, including planned exposures, to evaluate potential effects on the public and environment. This is necessary for regulatory compliance, such as obtaining permits or licenses, and for managing risks associated with specific projects like mining, nuclear facilities, waste disposal, and geothermal energy production. Specific to this project, the nature of the project is not such that it contains significant amounts of radioactivity. Therefore, a **Radioactive Impact Assessment is not required**.
Traffic Impact Assessment	N/A	Very Low	None	A traffic impact study or traffic impact assessment is a study which assesses the effect that a particular development has on the transportation network. New developments are one of the major causes of traffic congestion in many of the major cities of developing countries, due to the absence of adequate mitigation measures. Developments usually increases and/or contributes to the traffic in the area during the construction phase as a result of construction vehicles going to and from the development site and traffic control measure such as 'Stop and Go'. It is anticipated that the proposed development will not increase the traffic congestion as minimal construction vehicles will be used during the construction and operation phases and is a continuation of existing activities. Based on the EAPs assessment during the site sensitivity verification, the existing road network was noted to be currently sufficient for the anticipated minimal additional traffic load mainly during construction and no major congestions were noted. Therefore, a **Traffic Impact Assessment is not required for the project.**

Screening Tool identified specialist	Level of sensitivity	Suggested Sensitivity	Required level of assessment	Motivation
Geotechnical Assessment	N/A	N/A	Geotechnical Investigations	An assessment will be undertaken as part of the engineering works, where required for the expansion activities. The engineering works falls outside of the scope of this Basic Assessment Process.
Climate Impact Assessment	N/A	N/A	None	Climate change impact assessments seek to characterize, diagnose, and project risks or impacts of environmental change on people, communities, economic activities, infrastructure, ecosystems, or valued natural resource. The nature of the activity is not such that it will have a significant additional impact on climate. It is anticipated that there will be minimal additional impact on climate change largely limited to 'gaseous emissions' from vehicles and equipment/machinery. Therefore, **Climate Change Impact Assessment is not required for this project**.
Health Impact Assessment	N/A	N/A	None	A Health Risk Assessment is the process to estimate the nature and probability of adverse health effects in humans who may be exposed to harmful environmental conditions emanating from a specific source. The additional impacts, specifically health impacts are not significant in terms of the existing operations and the EAP is of the opinion that these impacts (such as air quality and noise levels) can be mitigated to acceptable levels. In terms of noise and air quality impacts, there will not be a significant increase. Therefore, a **Health Impact Assessment is not required for this project**.
Socio-Economic Assessment	N/A	N/A	None	The overarching aim of undertaking a Socio-Economic Assessment of a projects is to develop an understanding of the current social and economic environment and aims to assess or assesses the potential impact of the project on the socio-economic environment. Socio-Economic Assessment are usually undertaken for projects which have an impact and/or affect the social and/or economic structures such as low-cost housing projects, mixed-use developments, upgrading of informal settlements, linear projects transecting different communities, etc. Based on the project information and the purpose of the development largely relating to the nature of the project being the same activity already undertaken on the site, minimal socio-economic influence / change is anticipated. Therefore, a **Socio-Economic Assessment** is not required for the project due to the minimal anticipated changes / impacts on the surrounding social structures and potential cumulative socio-economic impacts which may emerge from the project. However, as part of the dynamic Social and

Screening Tool identified specialist	Level of sensitivity	Suggested Sensitivity	Required level of assessment	Motivation
				Labour Plan socio-economic assessments, it **is recommended that the SLP be updated to include the new activities**. However, it is not required as part of the BA process.
Ambient Air Quality Impact Assessment	N/A	N/A	None	Air Quality Impact Assessment (AQIA) is an evaluation, using approved computer models, of the ambient air quality impacts that the public may be expected to be exposed to due to air pollution emissions from one or more facilities. AQIA is an important technique for determining the relative contribution to ground level pollutant concentrations of specific current or future source emissions at receptor sites. AIQA is usually undertaken is for projects which will potentially emit and/or increase pollutant concentrations during construction and/or operational phases. The nature of the expansion activities involves minimal elevated fugitive emissions such as dust and particulate matter as well as gaseous emissions largely during the construction phase. It is anticipated that the expansion activities will not result in significant changes to the existing ambient air quality on site. Therefore, an **Ambient Air Quality Impact Assessment** is not required for the project.
Seismicity Assessment	N/A	N/A	None	A seismicity assessment is required for projects that have seismic risk and could be affected by an earthquake, such as the construction of buildings, infrastructure like bridges or pipelines, nuclear power plants, and large dams It is the EAPs understanding that there is sufficient data of the area available to the applicant from previous studies to determine whether activities will have significant impacts. In addition, it is understood that this will be closely assessed in the engineering scope of work such as the geotechnical assessment which will be undertaken outside of this Basic Assessment process. Therefore, **Seismicity Assessment is not required for this application**.
Plant Species Assessment	Low	Low	Compliance Statement	Similarly, to the rationale above on Terrestrial Biodiversity, a Terrestrial Biodiversity Assessment is required to confirm if there are no Flora or Fauna SCC, or protected species within the development site. The **Plant Species Assessment will be covered by the Terrestrial Biodiversity Compliance Statement**.
Animal Species Assessment	Medium	Low	Compliance Statement	Similarly, to the rationale above on Terrestrial Biodiversity, a Terrestrial Biodiversity Assessment is required to confirm if there are no Flora or Fauna SCC, or protected species

Screening Tool identified specialist	Level of sensitivity	Suggested Sensitivity	Required level of assessment	Motivation
				within the development site. The **Animal Species Assessment will be covered by the Terrestrial Biodiversity Compliance Statement**.



PART B: TRIGGERS AND KEY ISSUES

5. TRIGGERS FOR SPECIALIST INPUT

The need for visual input is often determined by issues relating to visual impact that may be raised by local residents or organisations, by the local authority, or on the recommendation of the EIA Practitioner of a project, or the visual specialist.

The following are indicators that could suggest the need for visual input based on the nature of the receiving environment and the nature of the project.

The nature of the receiving environment:

- Areas with protection status, such as national parks or nature reserves;
- Areas with proclaimed heritage sites or scenic routes;
- Areas with intact wilderness qualities, or pristine ecosystems;
- Areas with intact or outstanding rural or townscape qualities;
- Areas with a recognized special character or sense of place;
- Areas lying outside a defined urban edge line;
- Areas with sites of cultural or religious significance;
- Areas of important tourism or recreation value;
- Areas with important vistas or scenic corridors;
- Areas with visually prominent ridgelines or skylines.

The nature of the project:

- High intensity type projects including large-scale infrastructure;
- A change in land use from the prevailing use;
- A use that is in conflict with an adopted plan or vision for the area;
- A significant change to the fabric and character of the area;
- A significant change to the townscape or streetscape;
- Possible visual intrusion in the landscape;
- Obstruction of views of others in the area.

Figure 3: Triggers for Visual Impact Assessment (Oberholzer, 2005)

4.1.6 THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT (NEMWA)

The National Environmental Management: Waste Act, no 59 of 2008 (NEMWA) came into effect on the 1st of July 2009. The Waste Act places a general duty on a holder of waste to avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated; reduce, re-use, recycle and recover waste; where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner; manage the waste in such a manner that it does not endanger the health or the environment or cause a nuisance through noise, odour or visual impacts; prevent any employee or any person under his or her supervision from contravening the Act; and prevent the waste from being used for an unauthorised purpose. Section 16 of the NEMWA must also be considered which states the following:

1. A holder of waste must, within the holder's power, take all reasonable measures to-

   a) "Avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;

   b) Reduce, re-use, recycle and recover waste;

   c) Where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;

d) Manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour, or visual impacts;

e) Prevent any employee or any person under his or her supervision from contravening the Act; and

f) Prevent the waste from being used for unauthorised purposes."

These general principles of responsible waste management have been incorporated into the requirements in the EMPr to be implemented for this project.

Waste can be defined as either hazardous or general in accordance with Schedule 3 of the NEMWA (2014) as amended. "Schedule 3: Defined Wastes" has been broken down into two categories – Category A being hazardous waste; and Category B being general waste. In order to attempt to understand the implications of these waste groups, it is important to ensure that the definitions of all the relevant terminologies are defined:

- Hazardous waste: means "any waste that contains organic or inorganic elements or compounds that may, owning to the inherent physical, chemical or toxicological characteristic of that waste, have a detrimental impact on health and the environment and includes hazardous substances, materials or objects within business waste, residue deposits and residue stockpiles."

- Residue deposits: means "any residue stockpile remaining at the termination, cancellation or expiry of a prospecting right, mining right, mining permit, exploration right or production right."

- Residue stockpile: means "any debris, discard, tailings, slimes, screening, slurry, waste rock, foundry sand, mineral processing plant waste, ash or any other product derived from or incidental to a mining operation and which is stockpiled, stored or accumulated within the mining area for potential re-use, or which is disposed of, by the holder of a mining right, mining permit or, production right or an old order right, including historic mines and dumps created before the implementation of this Act."

- General waste: means "waste that does not pose an immediate hazard or threat to health or to the environment and includes – domestic waste; building and demolition waste; business waste; inert waste; or any waste classified as non-hazardous waste in terms of the regulations made under Section 69."

Furthermore, the NEMWA provides for specific waste management measures to be implemented, as well as providing for the licensing and control of waste management activities. The proposed RCM Opencast Area 3 expansion was assessed against the NEMWA Category A and Category B Listed Activities to determine if the proposed activity triggers a requirement for Waste Management License. A review of the proposed activity and NEMWA Category A and Category B Listed Activities revealed that the proposed expansion activities do not require a Waste Management License. However, should there be any changes to the project description which may trigger a requirement for a Waste Management License, the applicant must apply and obtain the required license before commencement of the activity. The mine has a current EA and WML for the stockpiling of waste rock and waste rock to be stockpiled from area 3 will be covered under the existing WML (NW30/5/1/2/3/2/1/336EM).

4.1.7 NEMWA WASTE CLASSIFICATION AND MANAGEMENT REGULATIONS, 2013

These regulations pertain to waste classification and management, including the management and control of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation which is relevant to the proposed project. The purpose of these Regulations is to –

Regulate the classification and management of waste in a manner which supports and implements the provisions of the Act;

Establish a mechanism and procedure for the listing of waste management activities that do not require a Waste Management Licence;

- Prescribe requirements for the disposal of waste to landfill;

- Prescribe requirements and timeframes for the management of certain wastes; and
- Prescribe general duties of waste generators, transporters and managers.

Waste classification, as presented in Chapter 4 of these regulations, entails the following:

- Wastes listed in Annexure 1 of these Regulations do not require classification in terms of SANS 10234;
- Subject to sub regulation (1), all waste generators must ensure that the waste they generate is classified in accordance with SANS 10234 within one hundred and eighty (180) days of generation;
- Waste must be kept separate for the purposes of classification in terms of sub regulation (2), and must not be mixed prior to classification;
- Waste-must be re-classified in terms of sub regulation (2) every five (5) years, or within 30 days of modification to the process or activity that generated the waste, changes in raw materials or other inputs, or any other variation of relevant factors;
- Waste that has been subjected to any form of treatment must be re-classified in terms of sub regulation (2), including any waste from the treatment process.; and
- If the Minister reasonably believes that a waste has not been classified correctly in terms of sub regulation (2), he or she may require the waste generator to have the classification peer reviewed to confirm the classification.

Furthermore, Chapter 8 of the Regulations stipulates that unless otherwise directed by the Minister to ensure a better environmental outcome, or in response to an emergency so as to protect human health, property or the environment –

- Waste generators must ensure that their waste is assessed in accordance with the Norms and Standards for Assessment of Waste for Landfill Disposal set in terms of section 7(1) of the Act prior to the disposal of the waste to landfill;
- Waste generators must ensure that the disposal of their waste to landfill is done in accordance with the Norms and Standards for Disposal of Waste to Landfill set in terms of section 7(1) of the Act; and
- Waste managers disposing of waste to landfill must only do so in accordance with the Norms and Standards for Disposal of Waste to Landfill set in terms of section 7 (1) of the Act.

4.1.8 THE NATIONAL WATER ACT, 1998

The National Water Act, 1998 (Act 36 of 1998 – NWA) makes provision for two types of applications for water use licences, namely individual applications and compulsory applications. The NWA also provides that the responsible authority may require an assessment by the applicant of the likely effect of the proposed licence on the resource quality, and that such assessment be subject to the NEMA EIA Regulations. These water use processes are described in Figure 4. A person may use water if the use is –

- Permissible as a continuation of an existing lawful water use (ELWU);
- Permissible in terms of a general authorisation (GA);
- Permissible under Schedule 1; or
- Authorised by a licence.

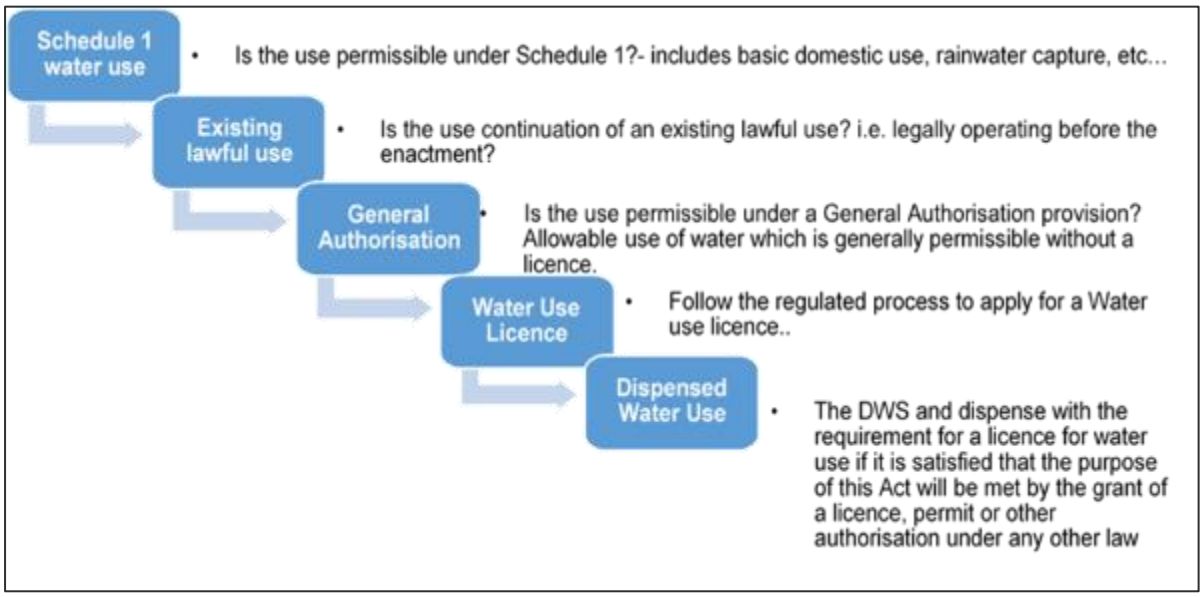


Figure 4: Authorisation processes for new water uses

The purpose of the NWA is to ensure that the nation's water resources are protected, used, developed, conserved and managed in ways that take into account:

- Meeting basic human needs of present and future generations;
- Promoting equitable access to water;
- Redressing the results of past racial discrimination;
- Promoting the efficient, sustainable and beneficial use of water in the public interest; facilitation social and economic development;
- Providing for the growing demand for water use;
- Protecting aquatic and associated ecosystems and their biological diversity;
- Reducing and preventing pollution and degradation of water resources;
- Meeting international obligations;
- Promoting dam safety; and
- Managing floods and drought.

The NWA defines 11 water uses in Section 21 of the Act. A water use may only be undertaken if authorised by the Department of Water and Sanitation (DWS). The water uses for which an authorisation or licence can be issued include:

- Taking water from a water resource;
- Storing water;
- Impeding or diverting the flow of water in a watercourse;
- Engaging in a stream flow reduction activity contemplated in section 36;
- Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);
- Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduits;

- Disposing of waste in a manner which may detrimentally impact on a water resource;
- Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
- Altering the bed, banks, course or characteristics of a watercourse;
- Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
- Using water for recreational purposes.

The regulated area of a watercourse for section 21 activities of the Act water uses is similarly defined in terms of the Act as follows:

- The outer edge of the 1 in 100-year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam;
- In the absence of a determined 1 in 100-year flood line or riparian area the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench (subject to compliance to section 144 of the Act); or
- A 500 m radius from the delineated boundary (extent) of any wetland or pan.

A review of the NWA Section 21 activities was undertaken to assess if the proposed development triggers any activity. Based on the information provided by the applicant and subsequent review of NWA Section 21 activities as well as the Aquatic and Wetlands Compliance Statement (The Biodiversity Company, 2025 – Appendix F), the proposed project does not trigger Section 21 of the NWA. Subsequently, a Water Use Authorisation is not required. However, should there be any changes to the project description which may trigger Section 21 of the NWA, the applicant must apply and obtain the required license before commencement of the activity.

4.1.8.1 THE NATIONAL WATER ACT, GOVERNMENT NOTICE 704, 1999

Regulations on Use of Water for Mining and Related Activities Aimed at the Protection of Water Resources Government Notice 704 (GNR 704) is a regulation under the National Water Act (Act No. 36 of 1998) in South Africa that places restrictions on mining operations for the purpose of protecting water resources. It prescribes measures and precautions that must be taken to prevent pollution of water resources and minimize the impact of mining activities on the environment. Compliance with this regulation is crucial for companies that engage in any mining related process on the mine including the operation of washing plants, mineral processing facilities, mineral refineries and extraction plants, and the operation and the use of mineral loading and off-loading zones, transport facilities and mineral storage yards. Non-compliance to GNR 704 can result in severe consequences for such companies, such as fines, penalties, and damage to their reputation.

The principle conditions of GN 704 applicable to the site and/or activity are:

i. Condition 4 – Restrictions on locality – No person in control of a mine or activity may:

(a) locate or place any residue deposit, dam, reservoir, together with any associated structure or any other facility within the 1:100 year flood-line or within a horizontal distance of 100 metres from any watercourse or estuary, borehole or well, excluding boreholes or wells drilled specifically to monitor the pollution of groundwater, or on water-logged ground, or on ground likely to become water-logged, undermined, unstable or cracked;

(b) except in relation to a matter contemplated in regulation 10 (i.e. Additional regulations relating to winning sand and alluvial minerals from watercourse or estuary), carry on any underground or opencast mining, prospecting or any other operation or activity under or within the 1:50 year flood-line or within a horizontal distance of 100 metres from any watercourse or estuary, whichever is the greatest;

(c) place or dispose of any residue or substance which causes or is likely to cause pollution of a water resource, in the workings of any underground or opencast mine excavation, prospecting diggings, pit or any other excavation; or

(d) use any area or locate any sanitary convenience, fuel depots, reservoir or depots for any substance which causes or is likely to cause pollution of a water resource within the 1:50 year flood-line of any watercourse or estuary.

ii. Condition 5 – Restrictions on use of material:

(a) No person in control of a mine or activity may use any residue or substance which causes or is likely to cause pollution of a water resource for the construction of any dam or other impoundment or any embankment, road or railway, or for any other purpose which is likely to cause pollution of a water resource.

iii. Condition 6 - Capacity requirements of clean and dirty water systems

Every person in control of a mine or activity must:

(a) confine any unpolluted water to a clean water system, away from any dirty area;

(b) design, construct, maintain and operate any clean water system at the mine or activity so that it is not likely to spill into any dirty water system more than once in 50 years;

(c) collect the water arising within any dirty area, including water seeping from mining operations. outcrops or any other activity, into a dirty water system;

(d) design, construct, maintain and operate any dirty water system at the mine or activity so that it is not likely to spill into any clean water system more than once in 50 years; and

(e) design, construct, maintain and operate any dam or tailings dam that forms part of a dirty water system to have a minimum freeboard of 0.8 metres above full supply level, unless otherwise specified in terms of Chapter 12 of the Act.

(f) design, construct and maintain all water systems in such a manner as to guarantee the serviceability of such conveyances for flows up to and including those arising as a result of the maximum flood with an average period of recurrence of once in 50 years

iv. Condition 7 – Protection of water resources

Every person in control of a mine or activity must take reasonable measures to:

(a) prevent water containing waste or any substance which causes or is likely to cause pollution of a water resource from entering any water resource, either by natural flow or by seepage, and must retain or collect such substance or water containing waste for use, re-use, evaporation or for purification and disposal in terms of the Act;

(b) design, modify, locate, construct and maintain all water systems, including residue deposits, in any area so as to prevent the pollution of any water resource through the operation or use thereof and to restrict the possibility of damage to the riparian or in-stream habitat through erosion or sedimentation, or the disturbance of vegetation, or the alteration of flow characteristics;

(c) cause effective measures to be taken to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings;

(d) design, modify, construct, maintain and use any dam or any residue deposit or stockpile used for the disposal or storage of mineral tailings, slimes, ash or other hydraulic transported substances, so that the water or waste therein, or falling therein, will not result in the failure thereof or impair the stability thereof;

(e) prevent the erosion or leaching of materials from any residue deposit or stockpile from any area and contain material or substances so eroded or leached in such area by providing suitable barrier dams, evaporation dams or any other effective measures to prevent this material or substance from entering and polluting any water resources;

(f) ensure that water used in any process at a mine or activity is recycled as far as practicable, and any facility, sump, pumping installation, catchment dam or other impoundment used for recycling water, is of adequate design and capacity to prevent the spillage, seepage or release of water containing waste at any time;

(g) at all times keep any water system free from any matter or obstruction which may affect the efficiency thereof; and

(h) cause all domestic waste, including wash-water, which cannot be disposed of in a municipal sewage system, to be disposed of in terms of an authorisation under the Act.

Based on project location and Aquatic and Wetlands Compliance Statement (The Biodiversity Company, 2025) attached in Appendix F, the proposed activities are not located within the 1:100-year floodline of a watercourse, or within 100 m from the edge of a watercourse (i.e. wetlands). Therefore, the proposed activities do not trigger GN 704 (Government Gazette 20118 of June 1999).

4.1.8.2 CATCHMENT MANAGEMENT STRATEGIES

In the development of the National Water Resources Strategy (2004) (a process that included extensive public participation) 19 water management areas were defined for the country, in each of which, it was envisaged, a Catchment Management Agency (CMA) would be established. This was a significant departure in approach to the management of water resources. However, there were concerns raised during the gazetting of the original Water Management Areas (WMA) as to the capacity of the country to support 19 CMAs. Taking these matters into consideration, a decision was made to reduce the number of water management areas to nine, concomitantly requiring the establishment of nine CMAs. To support this, the department has recognised the establishment and ring-fencing of Proto-CMAs, headed by an Acting Chief Executive Officer. Drawing on international experience one can identify several key drivers for catchment-based management of water resources, this includes amongst others:

- Achieving integrated management of the catchment;
- Facilitating the participation of stakeholders in decision making and management of water resources;
- Separation between the policy and national strategy functions of the Ministry/department and the operational functions of the CMA.

Each CMA progressively develops a Catchment Management Strategy (CMS) for the protection, use, development, conservation, management and control of water resources within its WMA. This is to ensure that on a regional scale, water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all persons. The main instrument that guides and governs the activities of a WMA is the Catchment Management Strategy (CMS) which, while conforming to relevant legislation and national strategies, provides detailed arrangements for the protection, use, development, conservation, management and control of the region's water resources.

According to the Geohydrological Study (Hydrogeek Consulting, 2025, attached in Appendix F), the project area falls within the Crocodile West and Marico Water Management Area (WMA), quaternary catchment A22H. The A22H quaternary catchment area is 579 km^2 and has a MAR of 14.07 million m^3. Runoff emanating from this quaternary catchment drains in a north–easterly direction via the Hex River. Elevations in the A22H quaternary range from 1220 meters above mean sea level (mamsl) at the highest point within the catchment and drop to 1112 mamsl at the outlet of the catchment.

Surface drainage at the Rustenburg Chrome Mine site occurs mainly towards the west in the direction of the Hex River. Runoff is taken by two tributaries which flow towards the west into the Hex River, of which one of

the tributaries originates at the RCM site. The elevation of this area ranges from 1130 mamsl to 1150 mamsl. Surface drainage at the Rietfontein Chrome Plant area occurs mainly towards the South, directly into the Sandspruit as this site is situated approximately 1 km from the Sandspruit. The main water course in the A22H quaternary catchment is the Hex River found on the western side of the project area; this river joins the Elands River which is a tributary to Crocodile River.

Currently, there are no formal CMS yet for the WMA. However, there are a Reconciliation Strategy for the Crocodile West Water Supply System dated September 2015 (Continuation Phase 2).

The abridged 2015 Reconciliation Strategy for the Crocodile West Water Supply System entails the following:

- The Rand Water service area in the Crocodile West River catchment will in future continue to be supplied from the Vaal River system and additional re-use will be considered only when surplus in the Crocodile River catchment becomes available.
- The areas north of the Magaliesberg outside the Rand Water supply area will receive increased treated effluent from the metropolitan areas as a future source of water.
- In the Waterberg area (north of Crocodile (West) River catchment) the optimal utilisation of local resources will continue and surplus water will be transferred to the Lephalale area to support water supply to the users there.
- Intervention to supply short-duration shortfall will be evaluated by investigating water demand management and/or potential augmentation by transferring treated wastewater from the Vaal River system to the Crocodile (West) River catchment.
- Available groundwater resources should be utilised in all areas and opportunities for conjunctive surface / groundwater utilisation should be explored. The rollout of the Strategy will rely on the following recommended activities:
    - The mining sector should provide annual updates of actual and projected water requirements.
    - Continuous coordination of planning between bulk water service providers.
    - Annual monitoring of water requirements and return flows as well as review of the water balance to consider revising long-term requirements projections.
    - Undertake Annual Operating Analyses and engage water users through the System Operating Forum (as part of a separate study undertaken by the Department of Water and Sanitation).
    - Complete validation and verification of existing lawful use and review the water balance.

The catchment area of the Crocodile (West) River is one of the most developed in the country. It is characterized by the sprawling urban and industrial areas of northern Johannesburg and Pretoria, extensive irrigation downstream of Hartbeespoort Dam and large mining developments north of the Magaliesberg. As a result, the Crocodile River is one of the rivers in the country that has been most influenced by human activities, and where more specific management strategies are of paramount importance. The water resources that naturally occur in the catchment have already been fully developed and most of the tributaries as well as the main stem of the Crocodile (West) River are highly regulated. Much of the water supplied to the metropolitan areas and some mining developments is transferred from the Vaal River system via Rand Water. This in turn results in large quantities of effluent from the urban and industrial users, most of which is after treatment, discharged to the river system, for re-use downstream. In many of the streams and impoundments, water quality is severely compromised by the proportionately large return flows. The effluent return flows constitute a large portion of the water availability in the catchment and are an important resource.

4.1.8.2.1 WATER BALANCE

The water balance in the Crocodile (West) River system was assessed by undertaking sophisticated risk analyses, including salinity modelling. Projected water balances were compiled for the planning period until the year 2050.

It was found that the system has surplus water originating from growing treated wastewater generated in the urban areas of Northern Gauteng. This water balance makes provision for the growing water needs of the mining sector (mainly around Rustenburg and north of the Magaliesberg and the Pilanesberg), the sprawling urban developments of Tshwane's northern areas, Madibeng Local Municipality as well as the areas served by the expansion plans of Magalies Water, primarily outside of the Rand Water supply area. The water requirements of the agricultural sector were also taken into consideration. Special attention was given to ensure that the assurance of water supply to irrigators, such as the Crocodile (West) Irrigation Board and the Makoppa area, was maintained. ii September 2015 Crocodile (West) River Reconciliation Strategy 2015 The water balance scenarios made provision that the source of water for the Rand Water supply area remains to be the Vaal River system, supported through all their transfer schemes, effectively representing an increasing inter-basin transfer taking place through the bulk supply pipelines of Rand Water. The utilisation of the projected surplus water in the Crocodile (West) River catchment will be for transfer to the Lephalale area as well as for re-use schemes within the catchment. Planned future utilisation of the increasing treated return flows through the proposed Tshwane Potable Water Augmentation Program will in future reduce the transfer from the Vaal River system and will also have an impact on the implementation date of further phases of the Lesotho Highlands Water Project. Due to the priority accorded by Government to the Strategically Important Projects (SIPs), which include the Lephalale mineral belt in the Mokolo River catchment north of the Crocodile (West) River, it was prudent to formulate the Strategy so that priority can be given to the future water needs of the Lephalale area in support of the national development imperatives. The resulting water balance for the Crocodile (West) River system, including the future transfer of water to the Lephalale area, indicated that small projected shortages could occur over the medium-term planning period. These shortages, however, are relatively small in volume and only temporary as the return flows in the Crocodile (West) River continue to grow. These projected shortfalls will require further interventions that could be in the form of infrastructure developments (further transfers from the Vaal River system) or water demand management measures within the Crocodile (West) River catchment.

4.1.8.2.2 RECONCILIATION STRATEGY

The objective of the Reconciliation Strategy is "to ensure the sufficient and reliable supply of water of appropriate quality to all existing and future users together with the best utilisation of resources in the catchment, at the lowest cost and in an environmentally sustainable manner". The Strategy is targeted at water related issues and addresses options, interventions and actions towards achieving the above objective. It is aware of the possible development scenarios and of the impacts and risks/uncertainties associated with the various options. The Strategy is not intended to be a singular master plan with fixed sequencing and time scales, but should be both flexible and robust under changing future conditions. The Strategy comprises:

1) Certain general items and ongoing activities that need to be attended to as primary functions in support of the implementation of other components of the Strategy; and

2) Specific strategies, other than the above, for addressing of other key issues.

Certain elements of the Strategy are common to all scenarios and are of general application towards improved water resource management. These include:

- The validation and verification of existing lawful water use, and confirmation of actual abstraction and use. This process has already been embarked upon and should be completed in the near future. The impact of the outcome of the study should be assessed, taken into account and updated in the data used to determine the water balances.

- Regular review as well as constant monitoring and enforcement of water use licenses. Without proper enforcement much of the water resource management strategies will be futile. These activities appear to have been neglected in recent years.

- The allocation and management of water resources to meet user water quality objectives.

- Management of the water resources in the Crocodile (West) River catchment in order to minimise both the excess outflows into the Limpopo River as well as the overall water transfers from the Vaal River system.

Specific Reconciliation Strategies The revised 2015 Crocodile (West) River System Reconciliation Strategy entails the following:

- The Rand Water service area in the Crocodile (West) River catchment will in future continue to be supplied from the Vaal River system and additional re-use within the catchment will be considered only when surplus becomes available.
- The areas north of the Magaliesberg outside the Rand Water supply area will receive increased treated effluent from the Metropolitan areas as a future source of water.
- In the Waterberg area, north of the Crocodile (West)River catchment, the future optimal utilisation of local resources will continue and surplus water in the Crocodile (West)River catchment will be transferred to the Lephalale area to augment the growing water supply to the users in the Mokolo River catchment.
- Interventions to supply a possible future temporary projected shortfall will be evaluated by investigating water demand management and/or potential augmentation by transferring treated wastewater from the Vaal River system to the Crocodile (West) River catchment. Available groundwater resources should be utilised in all areas and opportunities for conjunctive surface / groundwater utilisation should be explored.
- The mining sector should provide annual updates of historic water use and future water requirement projections.
- Continuous coordination of planning between bulk water service providers.
- Annual monitoring of actual water requirements and return flows and with a coinciding review of the water balance, to consider revising possible long-term projections.
- Continue with the Crocodile (West)Annual Operating Analyses and engage water users through the System Operating Forum associated with that project.

The mine applied for an Integrated Water Use License (IWUL) Licence No. 07/A22H/ACIGJ/9460), which was granted in 2020, by the Department of Water and Sanitation (DWS) for all the water uses listed in terms of Section 21 of the National Water Act, 1998 (Act No. 36 of 1998) (NWA).

4.1.9 THE NATIONAL ENVIRONMENTAL MANAGEMENT BIODIVERSITY ACT, 2004

The National Environmental Management Biodiversity Act (Act No. 10 of 2004 – NEMBA) provides for the management and conservation of South Africa's biodiversity within the framework of the NEMA as well as the protection of species and ecosystems that warrant national protection. Within the framework of this act, various regulations are promulgated which provide specific requirements and management measures relating to protecting threatened ecosystems, threatened or protected species as well as the control of alien and invasive species. A summary of these regulations is presented below.

4.1.9.1 **THE LIST OF ECOSYSTEMS THAT ARE THREATENED AND NEED OF PROTECTION, 2011**

The NEMBA provides for listing of threatened or protected ecosystems in one of the following categories:

- Critically Endangered (CR) ecosystems, being ecosystems that have undergone severe degradation of ecological structure, function or composition as a result of human intervention and are subject to an extremely high risk of irreversible transformation;
- Endangered (EN) ecosystems, being ecosystems that have undergone degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems;

- Vulnerable (VU) ecosystems, being ecosystems that have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems or endangered ecosystems; and
- Protected ecosystems, being ecosystems that are of high conservation value or of high national or provincial importance, although they are not listed as critically endangered, endangered or vulnerable.

According to the Terrestrial Biodiversity Compliance Statement (The Biodiversity Company, 2025 – Appendix F), the study area is located within the Endangered Marikana Thornveld Ecosystem. The study indicates that the identified ecosystem habitats on site are severely degraded or modified and provide little to no suitable habitat for SCCs. The ongoing mining practices result in dustfall, in addition to all other pollution. All habitats are associated with invasions and/or infestations by alien and invasive plant species, contributing to the degraded state of the habitats on site. No SCC were recorded or are expected to occur on the study area.

4.1.9.2 THE THREATENED OR PROTECTED SPECIES REGULATIONS, 2007

The purpose of these regulations is to -

- further regulate the permit system set out in Chapter 7 of the Biodiversity Act insofar as that system applies to restricted activities involving specimens of listed threatened or protected species;
- provide for the registration of captive breeding operations, commercial exhibition facilities, game farms, nurseries, scientific institutions, sanctuaries and rehabilitation facilities and wildlife traders;
- provide for the regulation of the carrying out of a specific restricted activity, namely hunting;
- provide for the prohibition of specific restricted activities involving specific listed threatened or protected species;
- provide for the protection of wild populations of listed threatened species; and
- provide for the composition and operating procedure of the Scientific Authority.

Based on the Terrestrial Biodiversity Compliance Statement (The Biodiversity Company, 2025 – Appendix F), the habitats on site are severely degraded or modified and provide little to no suitable habitat for indigenous species, let alone SCCs. High levels of human presence provide a constant deterrent, along with the ongoing mining practices which result in noise pollution, in addition to all other pollution. All habitats are associated with invasions and/or infestations by alien and invasive plant species, contributing to the degraded state of the habitats on site. No SCC were recorded or are expected to occur on the study area.

4.1.9.3 THE ALIEN AND INVASIVE SPECIES LIST, 2020

This Act is applicable since it protects the quality and quantity of arable land in South Africa. Loss of arable land should be avoided and declared Weeds and Invaders in South Africa are categorised according to one of the following categories, and require control or removal:

- *Category 1a Listed Invasive Species*: Category 1a Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be combated or eradicated;
- *Category 1b Listed Invasive Species*: Category 1b Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be controlled;
- *Category 2 Listed Invasive Species:* Category 2 Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be; and
- *Category 3 Listed Invasive Species*: Category 3 Listed Invasive Species are species that are listed by notice in terms of section 70(1)(a) of the Act, as species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of Act, as specified in the Notice.

Based on the Terrestrial Biodiversity Compliance Statement (The Biodiversity Company, 2025 – Appendix F), all habitats are associated with invasions and/or infestations by alien and invasive plant species, contributing to the degraded state of the habitats on site. Alien and invasive plant species, such as *Tagetes minuta, Bidens pilosa, Solanum seaforthianum, Xanthium strumarium, Datura ferox, Argemone ochroleuca, Datura stramonium, Campuloclinium macrocephalum, Tecoma stans, Flaveria bidentis, Lantana camara, Ipomoea purpurea* and *Melia azedarach* were identified by the specialist. Subsequently, an Alien Invasive Plant (AIP) Management Plan must be compiled and implemented. This should regularly be updated to reflect the annual changes in AIP composition.

4.1.10 THE NATIONAL FORESTS ACT, 1998

A licence is required for the removal of protected trees in terms of the NFA, (Act 84 of 1998). It is therefore necessary to conduct a survey that will determine the number and relevant details pertaining to protected tree species present in the development footprint for the submission of relevant permits to authorities prior to the disturbance of these individuals. Based on the Terrestrial Biodiversity Compliance Statement (The Biodiversity Company, 2025 – Appendix F), no protected trees were identified within the study area.

4.1.11 THE NATIONAL ENVIRONMENTAL MANAGEMENT: PROTECTED AREAS ACT

The National Environmental Management Protected Areas Act (Act No. 57 of 2003 – NEMPAA) is intended to "provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes" and creating a "national system of protected areas in South Africa as part of a strategy to manage and conserve its biodiversity".

The NEMPAA defines various kinds of protected areas, namely: "special nature reserves, national parks, nature reserves (including wilderness areas) and protected environments; world heritage sites; marine protected areas; specially protected forest areas, forest nature reserves and forest wilderness areas declared in terms of the National Forests Act, 1998 (Act 84 of 1998); and mountain catchment areas declared in terms of the Mountain Catchment Areas Act, 1970 (Act 63 of 1970)".

According to the protected area spatial datasets from SAPAD (2024) and SACAD (2024), the extended study area overlaps a SACAD Area viz. Magaliesberg Biosphere Reserve Transition Zone. It should however be noted that the proposed expansion area is located within a mining area and an area reserved for mining (Mining Right 336).

4.1.12 THE NATIONAL ENVIRONMENTAL MANAGEMENT AIR QUALITY ACT, 2004

The National Environmental Management: Air Quality Act (Act No. 39 of 2004 as amended – NEMAQA) is the main legislative tool for the management of air pollution and related activities. The Object of the Act is:

To protect the environment by providing reasonable measures for –

i. the protection and enhancement of the quality of air in the republic;

ii. the prevention of air pollution and ecological degradation;

iii. securing ecologically sustainable development while promoting justifiable economic and social development; and

iv. Generally, to give effect to Section 24(b) of the constitution in order to enhance the quality of ambient air for the sake of securing an environment that is not harmful to the health and well-being of people.

The NEMAQA mandates the Minister of Environment to publish a list of activities which result in atmospheric emissions and consequently cause significant detrimental effects on the environment, human health and social welfare. All scheduled processes as previously stipulated under the Air Pollution Prevention Act (APPA) are included as listed activities with additional activities being added to the list. The updated Listed Activities and Minimum National Emission Standards were published on the 22nd November 2013 (Government Gazette No. 37054).

According to the NEMAQA, air quality management control and enforcement is in the hands of local government with District and Metropolitan Municipalities as the licensing authorities. Provincial government is primarily

responsible for ambient monitoring and ensuring municipalities fulfil their legal obligations, with national government primarily as policy maker and co-ordinator. Each sphere of government must appoint an Air Quality Officer responsible for co-ordinating matters pertaining to air quality management. Given that air quality management under the old Act was the sole responsibility of national government, local authorities have in the past only been responsible for smoke and vehicle tailpipe emission control.

Listed Activities and Associated Minimum Emission Standards Identified in terms of Section 21 of the NEMAQA Published under GN 893 in GG 37054 of 22 November 2013 were assessed to determine if the proposed development triggers any of the identified activities. Based on the assessment, the proposed activities at the RCM Rustenburg mine does not trigger any Listed Activities and Associated Minimum Emission Standards Identified in terms of Section 21 of the NEMAQA. However, any changes to the project description which may trigger such listed activities must be assessed thoroughly for the applicant to check applicability for an Atmospheric Emission Licence (AEL).

National Ambient Air Quality Standards (NAAQS) were determined based on international best practice for particulate matter less than 10 and 2.5 µm in aerodynamic diameter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), carbon monoxide (CO), lead (Pb) and benzene. The NAAQS were published in the Government Gazette (no. 32816) on 24 December 2009 for PM_{10} and other pollutants (South Africa, 2009). The $PM_{2.5}$ NAAQS were published in 2012 (South Africa, 2012).

The NEMAQA also provides for the monitoring and reporting of GHG emissions. The National Greenhouse Gas Emission Reporting Regulations (South Africa, 2017) were published in terms of Section 53 (aA), (o) and (p) of NEM: AQA on 3 April 2017 and amended on 11 September 2020 (South Africa, 2020). The purpose of these Regulations is to implement a single national reporting system for the transparent reporting of GHG emissions.

The National Pollution Prevention Plans Regulations were published in March 2014 (Government Gazette 37421) and tie in with the National Greenhouse Gas (GHG) Emission Reporting Regulations which took effect on 3 April 2017. In summary, the Regulations aim to prescribe the requirements that pollution prevention plans of greenhouse gases declared as priority air pollutants, need to comply with in terms of the NEMAQA. The Regulations specify who needs to comply, and by when, as well as prescribing the content requirements.

The National Dust Control Regulations are promulgated under the NEMAQA and the purpose of these Regulations is to prescribe general measures for the control of dust in all areas. Dustfall is assessed for nuisance impact and not for inhalation health impact. The National Dust Control Regulations (Department of Environmental Affairs, 2013) prescribes measures for the control of dust in residential and non-residential areas. Acceptable dustfall rates are measured (using American Standard Testing Methodology (ASTM) D1739:1970 or equivalent) at and beyond the boundary of the premises where dust originates. In addition to the dustfall limits, the National Dust Control Regulations prescribe monitoring procedures and reporting requirements. Dust that may be created from the project (including but not limited to the construction and mining phase) will be managed in accordance with these Regulations.

According to the NEMAQA, air quality management control and enforcement is in the hands of local government with District and Metropolitan Municipalities as the licensing authorities. Provincial government is primarily responsible for ambient monitoring and ensuring municipalities fulfil their legal obligations, with national government primarily as policy maker and co-ordinator. Each sphere of government must appoint an Air Quality Officer responsible for co-ordinating matters pertaining to air quality management. Given that air quality management under the old Act was the sole responsibility of national government, local authorities have in the past only been responsible for smoke and vehicle tailpipe emission control.

4.1.12.1 THE NATIONAL DUST CONTROL REGULATIONS, 2013

Dustfall is assessed for nuisance impact and not for inhalation health impact. The National Dust Control Regulations (Department of Environmental Affairs, 2013) prescribes measures for the control of dust in residential and non-residential areas. Acceptable dustfall rates are measured (using American Standard Testing Methodology (ASTM) D1739:1970 or equivalent) at and beyond the boundary of the premises where dust originates. In addition to the dustfall limits, the National Dust Control Regulations prescribe monitoring

procedures and reporting requirements. Dust that may be created from the proposed mining expansion will be managed in accordance with these Regulations.

4.1.12.2 THE NATIONAL GREEN HOUSE GASES EMISSION REPORTING REGULATIONS, 2017

On 14 March 2014, the following six Green House Gases (GHGs) were declared as priority air pollutants in South Africa:

- Carbon dioxide (CO_2);
- Methane (CH_4);
- Nitrous Oxide (N_2O);
- Hydrofluorocarbons (HFCs);
- Perfluorocarbons (PFCs); and
- Sulphur hexafluoride (SF_6).

National GHG Emission Reporting Regulations (Government Gazette No. 40762 of 3 April 2017), as amended (General Notice 994 in Government Notice 43712 of 11 September 2020), were published by the DFFE. A person identified as a Category A data provider in terms Annexure 1 of these regulations, must register their facilities using the online South African Greenhouse Gas Reporting System (SAGERS) (https://ghgreporting-public.environment.gov.za/GHGlanding/). Once registered the data provider must submit a GHG emissions inventory, activity data and report in the required format given under Annexure 3 of these regulations on an annual basis. All data must be provided annually, by the 31 March of the following year. Based on the EAPs assessment, the proposed activity will not trigger GHG listed activities. However, any changes to the project description which may trigger such listed activities, the applicant would need to quantify and report on the proposed plant's GHG emissions by the 31 March of each year.

4.1.12.3 CLIMATE CHANGE ACT 22, 2024

The Climate Change Act sets out the functions of the Presidential Climate Commission, which includes providing advice on the Republic's climate change response to ensure the realisation of the vision for effective climate change response and the long-term just transition to a climate-resilient and low-carbon economy and society.

The Climate Change Bill aligns with Council's strategic objective of a stakeholder-aligned national energy transition that achieves South Africa's decarbonisation targets whilst maintaining energy security and affordable access for all South Africans. The Climate Change Bill recognises that South Africa has a vital role to play in the global effort to reduce greenhouse gas emissions and that Southern Africa is especially vulnerable to those impacts of climate change which require urgent and appropriate adaptation responses. RCM will be required to comply with greenhouse gas reporting requirements

4.1.13 THE NATIONAL HERITAGE RESOURCES ACT (NHRA)

The National Heritage Resources Act (Act 25 of 1999 – NHRA) stipulates that cultural heritage resources may not be disturbed without authorisation from the relevant heritage authority. Section 34(1) of the NHRA states that, "*no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority…*" The NHRA is utilised as the basis for the identification, evaluation and management of heritage resources and in the case of Cultural Resource Management (CRM) those resources specifically impacted on by development as stipulated in Section 38 of NHRA, and those developments administered through the NEMA, MPRDA and the Development Facilitation Act (FDA) legislation. In the latter cases the feedback from the relevant heritage resources authority is required by the State and Provincial Departments managing these Acts before any authorisations are granted for a development. The last few years have seen a significant change towards the inclusion of heritage assessments as a major component of Environmental Impact Processes required by the NEMA and MPRDA. This change requires us to evaluate the Section of these Acts relevant to heritage (Fourie, 2008).

The NEMA 23(2)(b) states that an integrated environmental management plan should, "…identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage". A study of subsections (23)(2)(d), (29)(1)(d), (32)(2)(d) and (34)(b) and their requirements reveals the compulsory inclusion of the identification of cultural resources, the evaluation of the impacts of the proposed activity on these resources, the identification of alternatives and the management procedures for such cultural resources for each of the documents noted in the Environmental Regulations. A further important aspect to be taken into account of in the EIA Regulations under the NEMA relates to the Specialist Report requirements (Appendix 6 of EIA Regulations 2014, as amended).

The MPRDA defines 'environment' as it is in the NEMA and, therefore, acknowledges cultural resources as part of the environment. Section 39(3)(b) of this Act specifically refers to the evaluation, assessment and identification of impacts on all heritage resources as identified in Section 3(2) of the NHRA that are to be impacted on by activities governed by the MPRDA. Section 40 of the same Act requires the consultation with any State Department administering any law that has relevance on such an application through Section 39 of the MPRDA.

Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as—

a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

b) the construction of a bridge or similar structure exceeding 50 m in length;

c) any development or other activity which will change the character of a site—

    i. exceeding 5 000 m^2 in extent; or

    ii. involving three or more existing erven or subdivisions thereof; or

    iii. involving three or more erven or divisions thereof which have been consolidated within the past five years; or

    iv. the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

d) the re-zoning of a site exceeding 10 000 m2 in extent; or

e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development

According to the national web-based environmental screening tool (DFFE Screening Tool Report), the proposed development is located within an area of Low Heritage Sensitivity. An assessment of the NHRA and preliminary project information revealed known heritage features and in addition, the proposed development will most likely trigger Section 38(1) of the NHRA. Therefore, a Heritage Impact Assessment was required and undertaken.

The Heritage Impact Assessment undertaken by PGS Heritage (2025) attached in Appendix F, identified various heritage resources within the study area including archaeological resources and Burial Grounds and Graves (BGG) which are rated as having a high heritage significance and will require further mitigation work before the project can continue. The study identified fifty-six heritage resources, mostly forming part of a larger LIA occupation of the koppie and consist of both varying density pottery scatters graded as IIIB/IIIC to NCW and LIA walling graded as IIIB. Additionally, an ESA scatter, a clay and stone built homestead with possible infant burials and an expansive extent historical stone walling, where the stones used to build it were robbed from the LIA settlement, were documented. Previous studies in the footprint have also identified various other heritage resources including: 2 cemeteries or graveyards, historical infrastructure, a historical homestead, a past community settlement, an ungraded heritage site, MSA stone tool scatters and further LIA occupation of the koppie located in the study area. Desktop analysis further highlighted the greater extent of LIA walling around

the koppie and fieldwork has indicated that LIA walling is present at/near the koppie despite not being visible on satellite imagery. It should be noted that this study was conducted as part of a larger study and not all the above heritage features occurs on the proposed expansion area. The heritage features occurring on the study area (expansion area) mainly include stone walling, kraals and pottery.

Refer to Section 7.11 for the discussion on Archaeological and Cultural Heritage and Appendix F for the detailed study. The South African Heritage Resources Agency (SAHRA), the North West Provincial Heritage Resources Authority (NWPHRA) and Association of Southern African Professional Archaeologists (ASAPA) are I&APs in the project and will be provided with a copy of the report for review and comment.

4.1.14 THE NATIONAL NOISE CONTROL REGULATIONS, 1992

In terms of section 25 of the ECA, the National Noise Control Regulations (GN R. 154 – NCRs) published in Government Gazette No. 13717 dated 10 January 1992, were promulgated. The NCRs were revised under GN R. 55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations. Provincial noise control regulations have been promulgated in Gauteng, Free State and Western Cape Provinces.

The NCRs will need to be considered in relation to the potential noise that may be generated mainly during the construction phase of the proposed project. The two key aspects of the NCRs relate to disturbing noise and noise nuisance.

Section 4 of the Regulations prohibits a person from making, producing or causing a disturbing noise, or allowing it to be made produced or caused by any person, machine, device or apparatus or any combination thereof. A disturbing noise is defined in the Regulations as "*a noise level which exceeds the zone sound level or if no zone sound level has been designated, a noise level which exceeds the ambient sound level at the same measuring point by 7 dBA or more*."

Section 5 of the NCRs in essence prohibits the creation of a noise nuisance. A noise nuisance is defined as "*any sound which disturbs or impairs or may disturb or impair the convenience or peace of any person".* The South African National Standard 10103 also applies to the measurement and consideration of environmental noise and should be considered in conjunction with these Regulations.

The nature of the activities involves elevated sound levels and may have a significant acoustic output, thereby impacting nearby sensitive receptors such as fauna and homesteads or residential areas. However, as previously indicated, there are no sensitive receptors in the area. The area is predominantly mining with no residential or sensitive fauna identified. Therefore, there will be minimal noise impacts associated with the proposed activities.

4.1.14.1 **THE NOISE STANDARDS**

There are a few South African scientific standards (SABS) relevant to noise from mines, industry and roads. South African National Standard (SANS) 10103:2008 – 'The measurement and rating of environmental noise with respect to annoyance and to speech communication';

- SANS 10210:2004 – 'Calculating and predicting road traffic noise';
- SANS 10328:2008 – 'Methods for environmental noise impact assessments';
- SANS 10357:2004 – 'The calculation of sound propagation by the Concave method';
- SANS 10181:2003 – 'The Measurement of Noise Emitted by Road Vehicles when Stationary'; and
- SANS 10205:2003 – 'The Measurement of Noise Emitted by Motor Vehicles in Motion'.

The relevant standards use the equivalent continuous rating level as a basis for determining what is acceptable. The levels may take single event noise into account, but single event noise by itself does not determine whether noise levels are acceptable for land use purposes. With regards to SANS 10103:2008, the recommendations are likely to inform decisions by authorities, but non-compliance with the standard will not necessarily render an activity unlawful per se. It is noted that Draft Environmental Noise Standards were published under the NEMAQA, in June 2024. These recommended Environmental Noise Standards reference the SANS 10103 (2008).

4.1.15 THE CONSERVATION OF AGRICULTURAL RESOURCES ACT (CARA)

The law on Conservation of Agricultural Resources (Act 43 of 1983) aims to provide for the conservation of the natural agricultural resources of the Republic by the maintenance of the production potential of land, by the combating and prevention of erosion and weakening or destruction of the water sources, and by the protection of the vegetation and the combating of weeds and invader plants. In order to achieve the objectives of this Act, control measures related to the following may be prescribed to land users to whom they apply:

- The cultivation of virgin soil;
- The utilisation and protection of land which is cultivated;
- The irrigation of land;
- The prevention or control of waterlogging or salination of land;
- The utilisation and protection of vleis, marshes, water sponges, water courses and water sources;
- The regulating of the flow pattern of run-off water;
- The utilisation and protection of the vegetation;
- The grazing capacity of veld, expressed as an area of veld per large stock unit;
- The maximum number and the kind of animals which may be kept on veld; The prevention and control of veld fires;
- The utilisation and protection of veld which has burned;
- The control of weeds and invader plants;
- The restoration or reclamation of eroded land or land which is otherwise disturbed or denuded;
- The protection of water sources against pollution on account of farming practices;
- The construction, maintenance, alteration or removal of soil conservation works or other structures on land; and
- Any other matter which the Minister may deem necessary or expedient in order that the objects of this Act may be achieved.

Further, different control measures may be prescribed in respect of different classes of land users or different areas or in such other respects as the Minister may determine. Impacts on the soil, biodiversity and water resources have been identified with regards to the proposed development, and mitigation and management measures recommended (refer to Section 8, Table 30 and Appendix H). These will be updated in the final Basic Assessment Report where necessary.

4.1.16 THE SUB-DIVISION OF AGRICULTURAL LAND ACT, 1970

In terms of the Subdivision of Agricultural Land Act (Act 70 of 1970), any application for change of land use must be approved by the Minister of Agriculture, and while under the Conservation of Agricultural Resources Act (Act 43 of 1983) no degradation of natural land is permitted. Rezoning of the properties from agricultural use to mining may be required.

4.1.17 THE SPATIAL PLANNING AND LAND USE MANAGEMENT ACT (SPLUMA)

The Spatial Planning and Land Use Management (Act 16 of 2013 – SPLUMA) is set to aid effective and efficient planning and land use management, as well as to promote optimal exploitation of minerals and mineral resources. The SPLUMA was developed to legislate for a single, integrated planning system for the entire country. Therefore, the Act provides a framework for a planning system for the country and introduces

provisions to cater for development principles; norms and standards; inter-governmental support; Spatial Development Frameworks (SDFs) across national, provincial, regional and municipal areas; Land Use Schemes; and municipal planning tribunals. Furthermore, the SPLUMA strengthens the position of mining right holders when land needs to be rezoned for mining purposes. The affected mine properties will require zoning as mining use.

The Spatial Planning and Land Use Management (Act 16 of 2013 – SPLUMA) is set to aid effective and efficient planning and land use management, as well as to promote optimal exploitation of minerals and mineral resources. The SPLUMA was developed to legislate for a single, integrated planning system for the entire country. Therefore, the Act provides a framework for a planning system for the country and introduces provisions to cater for development principles; norms and standards; inter-governmental support; Spatial Development Frameworks (SDFs) across national, provincial, regional and municipal areas; Land Use Schemes (LUS); and municipal planning tribunals. Furthermore, the SPLUMA strengthens the position of mining right holders when land needs to be re-zoned for mining purposes. Rezoning of properties from agricultural use to mining may be required to cater for the proposed mining activity.

4.1.18 MINE HEALTH AND SAFETY ACT

The Mine Health and Safety Act, 1996 (Act No. 29 of 1996) aims to protect the health and safety of employees and other persons at mines by promoting a culture of safety, enforcing risk management, and ensuring participation of all stakeholders. It requires employers to provide and maintain a safe working environment, conduct risk assessments, implement control measures, and establish health and safety policies, codes of practice, and emergency plans. Employers must also provide training, conduct occupational hygiene monitoring, and maintain medical surveillance records. Employees are obligated to comply with safety measures, report hazards, and may refuse dangerous work without penalty. The Act further mandates the formation of health and safety committees, reporting of incidents, and oversight by the Mine Health and Safety Council, with penalties for non-compliance.

4.1.19 OCCUPATIONAL HEALTH AND SAFETY ACT

The Occupational Health and Safety Act (Act 85 of 1993 - OHSA) provides for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety; and to provide for matters connected therewith. Worker safety will form part of the contractor's safety requirements and be guided by the OHSA. This would entail a full health and safety file including but not limited to pre-mobilization medical assessments, work environment and task specific risk assessments and method statements etc. The project will be required to comply with the OHSA and or Mine Health and Safety Act (dependent on the specific aspect of the production operations). Therefore, safety of all personnel will be guided by overarching South African legislation.

The Major Hazard Installation Regulations (GNR 692 of 30 July 2001) are promulgated under the OHSA and apply to employers, self-employed persons and users, who have on their premises, either permanently or temporarily, a major hazard installation or a quantity of a substance which may pose a risk that could affect the health and safety of employees and the public.

A "major hazard installation" (MHI| means an installation- where more than the prescribed quantity of any substance is or may be kept, whether permanently or temporarily; or where any substance is produced, processed, used, handled or stored in such a form and quantity that it has the potential to cause a major incident. No MHI assessment is anticipated for the proposed development.

4.1.20 NATIONAL VELD AND FOREST FIRE ACT

The National Veld and Forest Fire Act 101 of 1998 is a key piece of legislation in South Africa aimed at reforming the legal framework surrounding veld and forest fires. Its primary purpose is to prevent and manage wildfires through coordinated efforts, particularly in rural and fire-prone areas. The Act encourages the formation of Fire Protection Associations (FPAs), which are legally recognized bodies that facilitate local collaboration among

landowners, municipalities, and other stakeholders to predict, prevent, and suppress veldfires. These associations play a vital role in fire management by offering training, support, and technical expertise to their members.

For private developers and landowners, the Act imposes several important obligations. They are legally required to take reasonable precautions to prevent fires from starting or spreading from their property. This includes maintaining firebreaks, ensuring that controlled burns are conducted safely and in accordance with regulations, and joining or cooperating with local FPAs. Failure to meet these responsibilities can result in legal liability, especially if negligence leads to damage or loss caused by a fire. In such cases, landowners may face civil claims for damages, making it essential for them to understand and comply with the Act's provisions.

In essence, the Act not only promotes proactive fire management but also establishes a framework for accountability. Private developers and landowners must be vigilant and informed, as their actions—or lack thereof—can have significant legal and financial consequences. By participating in FPAs and adhering to fire safety regulations, they contribute to a safer and more resilient environment for their communities and the broader ecosystem.

4.1.21 NATIONAL RADIOACTIVE WASTE DISPOSAL INSTITUTE ACT 53 OF 2008

In terms of this Act the generators of radioactive waste are responsible for technical, financial and administrative management of such waste within the national regulatory framework at their premises and when such waste is transported to an authorised waste disposal facility. The generators of radioactive waste are responsible for technical, financial and administrative management of such waste within the national regulatory framework at their premises and when such waste is transported to an authorised waste disposal facility.

Generators of radioactive waste must:

a) develop and implement site-specific waste management plans based on national policy;

b) provide all relevant information on radioactive waste as required by the chief executive officer;

c) demonstrate compliance with any conditions of a radioactive waste disposal certificate;

d) provide site access to staff of the Institute for inspection against any conditions of the radioactive waste disposal certificate.

Although it is not anticipated that the proposed development will trigger any requirements under the NRWDIA it is recommended that the National Nuclear Regulator (NNR) is contacted and requested to advise on any specific requirements or obligations.

4.1.22 THE HAZARDOUS SUBSTANCES ACT, 1973 (ACT NO. 15 OF 1973)

The Hazardous Substances Act, 1973 (Act No. 15 of 1973) in South Africa regulates substances that can cause harm to human health. It categorizes these substances based on their risk level and controls their manufacture, sale, use, and disposal. The Act also provides for inspections, enforcement measures, and penalties for violations. The Act defines hazardous substances as materials or mixtures that can cause harm to human health, ranging from mild irritation to severe illness or death.

The Act addresses the control of substances that can cause injury, ill-health, or death due to their hazardous properties. This includes substances found in mine tailings, which often contain cyanide, arsenic, mercury and other heavy metals. The Act aims to regulate the handling, use, and disposal of these substances to protect human health and the environment.

4.2 OTHER APPLICABLE ACTS AND GUIDELINES

Other applicable acts and guidelines include various provincial and local guidelines and plans which are further described below.

4.2.1 THE MINING AND BIODIVERSITY GUIDELINES, 2013

The Mining and Biodiversity Guidelines (2013) was developed by the Department of Mineral Resources, the Chamber of Mines, the SANBI and the South African Mining and Biodiversity Forum, with the intention to find a balance between economic growth and environmental sustainability. The Guideline is envisioned as a tool to "foster a strong relationship between biodiversity and mining, which will eventually translate into best practice within the mining sector. It provides a tool to facilitate the sustainable development of South Africa's mineral resources, in a way that enables regulators, industry and practitioners to minimise the impact of mining on the country's biodiversity and ecosystem services. It provides the mining sector with a practical, user- friendly manual for integrating biodiversity considerations into the planning processes and managing biodiversity during the operational phases of a mine, from exploration through to closure. The Guideline provides explicit direction in terms of where: mining-related impacts are legally prohibited; biodiversity priority areas may present high risks for mining projects; and biodiversity may limit the potential for mining.

In identifying biodiversity priority areas, which have different levels of risk against mining, the guideline categorises biodiversity priority areas into four categories of biodiversity priority areas in relation to their importance from a biodiversity and ecosystem service point of view as well as the implications for mining in these areas:

A) Legally protected areas, where mining is prohibited;

B) Areas of highest biodiversity importance, which are at the highest risk for mining;

C) Areas of high biodiversity importance, which are at a high risk for mining; and

D) Areas of moderate biodiversity importance, which are at a moderate risk for mining.

In terms of the Mining and Biodiversity Guidelines (2013) spatial dataset, the study area is of medium and high Biodiversity Importance (BI), therefore mining is not prohibited from being undertaken within the proposed expansion area.

4.2.2 INTERIM GUIDANCE ON THE MANAGEMENT OF NORM TAILINGS AND WASTE ROCK

The National Nuclear Regulator (NNR) exercises regulatory control related to nuclear safety and security for all the activities and facilities as defined in the NNR Act. The process waste generated at a mining and minerals processing facility, also known as slurry, is naturally radioactive because of the associated radionuclides in the uranium and thorium decay series that accompany the metals that are mined. The slurry, also referred to as Naturally Occurring Radioactive Material (NORM) residue, is pumped to containment areas for permanent or temporary storage and thus qualifies as radioactive waste facilities named NORM tailings dams, also interchangeably referred to as Tailings Storage Facilities (TSF).

This document provides guidance for the implementation of the requirements as set out in the draft General Nuclear Safety Regulations on the management of NORM tailings and waste rock. Due to the lengthy promulgation process for regulations, and the fact that the guidance provided is based on draft regulations, the Executive has resolved to issue this document as interim guidance. This document will be revised once the regulations in question have been promulgated.

The guidance is applicable to all NORM facilities which carry out activities and operations involving NORM tailings and waste rock containing uranium, thorium and their progeny. This guide extends to both authorised facilities regulated by the NNR and prospective applicants who wish to handle, process and dispose of NORM tailings and waste rock in terms of the provisions of the NNR Act and associated regulations.

This guideline contains information that provide guidance in terms of best practice in terms of EIA aspects that is related to mining and specifically mineral processing. While the best practice guidance must to be taken into account, this document does not take the place of legal advice in a specific situation governed by legislation.

Key aspects of an NNR-approved Closure Plan include:

- Decommissioning Strategy: The plan specifies the methods for dismantling the facility, removing or treating radioactive materials, and decontaminating equipment and site surfaces.
- Environmental Protection: It includes measures to prevent or mitigate environmental damage from decommissioning activities, such as controlling dust, managing waste, and protecting water resources.
- Public and Worker Safety: The plan outlines procedures for protecting the health and safety of workers involved in decommissioning and the public who may be affected by the process.
- Long-Term Stewardship: The plan addresses the long-term management of any residual risks or contamination, ensuring that the site remains safe for the future.
- Financial Assurance: It demonstrates that sufficient financial resources are available to implement the closure plan and manage any long-term liabilities.
- Regulatory Compliance: The plan must be developed in accordance with the NNR's regulations and guidance documents.

The NNR will be consulted to provide comments on the potential requirements for the project.

4.2.3 NORTH WEST BIODIVERSITY SECTOR PLAN

The North West Biodiversity Sector Plan (READ, 2015) classifies areas within the province on the basis of their contributions to reaching the associated conservation targets within the province. These areas are primarily classified as either Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs). These biodiversity priority areas, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species, as well as the long-term ecological functioning of the landscape as a whole.

CBAs are areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and healthy functioning of important species and ecosystems and the delivery of ecosystem services. Thus, if these areas are not maintained in a natural or near natural state then provincial biodiversity targets cannot be met (SANBI, 2017).

ESAs are areas that are not essential for meeting biodiversity representation targets but play an important role in supporting the ecological functioning of ecosystems as well as adjacent Critical Biodiversity Areas, and/or in delivering ecosystem services that support socio-economic development (SANBI, 2017).

Provincial CBAs and ESAs are often further classified into sub-categories, such as CBA1 and CBA2 or ESA1 and ESA2. These present fine scale habitat and biodiversity area baseline requirements and associated land management objectives or outcomes. The highest categorisation level is often referred to as an 'Irreplaceable Critical Biodiversity Area' which usually represents pristine natural habitat that is very important for conservation.

Based on the Terrestrial Biodiversity Compliance Statement (The Biodiversity Company, 2025 – Appendix F), the study area is located within CBA 2 and ESA 2.

4.2.4 THE MAGALIESBERG BIOSPHERE MANAGEMENT PLAN

The Magaliesberg Biosphere Management Plan (2015) (hereafter MBMP (2015)) states that the Transition Zones are to be co-operative where various activities are allowed such as settlements, agriculture, mining, support services and infrastructure. However, the focus of this area is for collaboration of various stakeholders to increase environmental public awareness, education and specialist training aimed at reducing the impact on the Magaliesberg area while also enhancing community benefits and promoting sustainable development practices (MBMP, 2015). The evaluation criteria for development/activity proposals within the Transitional Area as described in Annexure 1 of the Magaliesberg Biosphere Management Plan should be considered.

4.2.5 MUNICIPAL POLICY AND PLANNING CONTEXT

The Bojanala Platinum District Municipality Environmental Management Framework (EMF) (2018) (hereafter referred to as the BPDM EMF (2018)) aims to provide a decision support tool regarding environmental impact matters of proposed developments and human activities. An EMF is an Integrated Environmental Management (IEM) tool that assists competent authorities with their decisions regarding the granting or refusal of environmental authorisations by also providing geographical context of the environmental impacts that could occur as a result of the proposed development.

The BPDM EMF (2018) covers the local municipalities of Rustenburg, Moretele, Madibeng, Kgetlengrivier and Moses Kotane in the North West Province. The site falls within the outer area of the Magaliesberg Biosphere Reserve Transitional Area (Zone), as such, the BPDM EMF (2018) requires that the management authority of the Magaliesberg Biosphere is consulted for new developments. The Magaliesberg Biosphere Management Authority will be consulted as part of the Basic Assessment Process.

The Rustenburg Local Municipality Integrated Development Plan (IDP) is a strategic planning instrument intended to guide and inform budgeting, planning, management and the decision-making process. The priorities and objectives are aimed at addressing strategic challenges within the Rustenburg Local Municipality (RLM). The Rustenburg IDP identifies a diversified economic growth, vibrant rural development and job creation as one of the key mayoral strategic priorities (IDP 2022-2027 and 2025/26 IDP Review).

The Rustenburg Spatial Development Framework (SDF) is a policy document that is designed to guide spatial planning and development within the RLM and is mandated in terms of Section 12(1) of SPLUMA. The document is intended to guide and inform decisions regarding land use and development within the RLM, and to give effect to the goals, objectives and visions of the municipal IDP. The proposed mining activities and infrastructure are located within an Industrial and Mining Development Zone of the SDF.

Section 3.7.5 of the IDP lists Key Performance Area 3 of their Local Economic Development (LED) Strategy as – Sustainable Development Goal (SDG) 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all. SDG Target 8.3 specifically includes:

- Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage formalization and growth of micro-, small- and medium-sized enterprises including through access to financial services.

In terms of this goal the LED Strategy includes five Strategic Goals to enable it to effectively focus and prioritize in delivering on its mandate and strategic priorities:

1) Policy coherence and economic intelligence to drive socio-economic transformation and a sustainable local economy.
2) Create an enabling and conducive business environment to enhance RLM competitiveness as a destination of choice for tourism, investment and trade.
3) Accelerated and shared economic growth through skills development and enterprise development to promote an entrepreneurial culture that will contribute towards improving the livelihoods of the RLM communities.
4) Good cooperative governance that promotes public private partnerships in support of the socio-economic development programme of RLM.
5) Effective systems and processes and efficient resource utilisation to promote and support a high-performance culture

In order to achieve these goals, the municipality has as one of its Strategic Objectives the following objective:

- Create an enabling and conducive business environment to enhance RLM competitiveness as a destination of choice for tourism, investment and trade. To enable the development of enterprises in the following economic sectors: tourism, arts, culture, sports and heritage; agriculture and agro-

processing; manufacturing, logistics and industrial development; mining beneficiation, education & skills development; informal trading and green economy.

The Rustenburg Local Municipality Economic sector diversification will focus on inter alia the Mining and beneficiation sector to develop the local economy, by developing and continuing the Mining and Industrialisation Programme to support and develop local business in the mining and industrial sector which has a lot of economic activity needed to be explored and facilitated for local businesses to participate. The programme to cover the following as part of it implementation plan:

- Small Scale Mining;
- Re-mining;
- Mine ownership;
- Compliance Support;
- Skills Development;
- Financing;
- Infrastructure Development;
- Social Investment; and
- Environmental sustainability.

In addition, The Green Economy Development Programme has been developed to encourage local SMMEs to create innovative projects from processing of waste materials (Household and Industrial). The programme includes inter alia the promotion of re-mining.

5 PROJECT ALTERNATIVE ASSESSMENT

In terms of the EIA Regulations published in Government Notice (GN) R982 of 2014, as amended, feasible and reasonable alternatives must be identified and considered within the environmental assessment process. An alternative is defined as "…in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the:

(a) property on which or location where it is proposed to undertake the activity;

(b) type of activity to be undertaken;

(c) design or layout of the activity;

(d) technology to be used in the activity;

(e) operational aspects of the activity; and

(f) Includes the option of not implementing the activity."

In terms of Section 24 of NEMA, the proponent is required to demonstrate that alternatives have been described and investigated in sufficient detail during the EIA process. It is important to highlight that alternatives must be practical, feasible, reasonable and viable to cater for an unbiased approach to the project and in turn to ensure environmental protection. In order to ensure full disclosure of alternative activities, it is important that various role players contribute to their identification and evaluation. Stakeholders have an important contribution to make during the EIA Process and each role is detailed as follows:

The role of the environmental assessment practitioner is to:

- encourage the proponent to consider all feasible alternatives;
- Identify reasonable alternatives;
- provide opportunities for stakeholder input to the identification and evaluation of alternatives;
- document the process of identification and selection of alternatives;
- provide a comprehensive consideration of the impacts of each of the alternatives; and
- document the process of evaluation of alternatives.

The role of the proponent is to:

- assist in the identification of alternatives, particularly where these may be of a technical nature;
- disclose all information relevant to the identification and evaluation of alternatives;
- be open to the consideration of all reasonable alternatives; and
- be prepared for possible modifications to the project proposal before settling on a preferred option.

The role of the public is to:

- assist in the identification of alternatives, particularly where local knowledge is required;
- be open to the consideration of all reasonable alternatives; and
- recognise that there is rarely one favoured alternative that suits all stakeholders and that alternatives will be evaluated across a broad range of criteria, including environmental, social and economic aspects.

Table 9 outlines the various alternative types that must be considered for each development. The extent of the applicability of each of these is further presented. It must be highlighted that the alternatives presented in the table are derived from both the EIA Regulations (2014) as amended as well as the Department of Environmental Affairs and Tourism's (now Department of Forestry, Fisheries and the Environment (DFFE) 2004 Integrated Environmental Information Series on the Criteria for determining alternatives in EIA. Where the alternative is applicable to the project, it is further discussed this Report. The identified alternatives discussed further in this BAR are as follows:

- The No-Go Option;
- Process alternatives; and
- Input alternatives;

Table 9: Project alternatives as per NEMA EIA Regulations, 2014 as amended.

ALTERNATIVE	COMMENT
No-go Option	The 'no-go' alternative is sometimes referred to as the 'no-action' alternative (Glasson *et al.,* 1999) and at other times the 'zero-alternative'. It assumes that the activity does not go ahead, implying a continuation of the current situation or the status quo. This alternative must be discussed on all projects as it allows for an assessment of impacts should the activity not be undertaken. **This alternative is discussed in this report (Section 5.1).**
Activity alternatives	These are sometimes referred to as project alternatives, although the term activity can be used in a broad sense to embrace policies, plans and programmes as well as projects. Consideration of such alternatives requires a change in the nature of the proposed activity. This would entail a process where a different project is proposed instead of the RCM project. **Based on project information, there is one proposed activity and no other activity alternative. Therefore, this alternative is not considered feasible and will not be discussed further in this report.**
Location / property alternatives	The location of the activity is controlled to a large extent by the location of the ore body as well as the extent of the mining right**.** No other location alternatives have been identified. **Therefore, this alternative is not considered feasible and will not be discussed further in this report**
Process alternatives	Various terms are used for this category, including technological alternative and equipment alternative. The purpose of considering such alternatives is to include the option of achieving the same goal by using a different method or process. An industrial process could be changed, or an alternative technology could be used. These are also known as technological and equipment alternative and will be discussed as they are applicable to the RCM project. **These alternatives are considered feasible and will be discussed further in this report (Section 5.2).**
Demand alternatives	Demand alternatives arise when a demand for a certain product or service can be met by some alternative means. This is applicable to the demand for a product or service. An example of this would be where there is a need to provide housing units. Examples of alternatives can be through managing demand through various methods or providing additional housing through either single dwelling residential units or mixed-use developments. Specific to the proposed project, no feasible demand

ALTERNATIVE	COMMENT
	alternatives have been identified. **Therefore, this alternative is not considered feasible and will not be discussed further in this report.**
Scheduling alternatives	These are sometimes known as sequencing or phasing alternatives. In this case an activity may comprise several components, which can be scheduled in a different order or at different times and as such produce different impacts. No specific scheduling alternatives have been identified. **Therefore, this alternative is not considered feasible and will not be discussed further in this report.**
Input alternatives	By their nature, input alternatives are most applicable to industrial applications that may use different raw materials or energy sources in their processes. Considering that the proposed development is an expansion of Mining areas and infrastructure as well as the development or expansion of an opencast mine, **feasible input alternatives are not applicable to the project and will not be discussed further in this report.**
Routing alternatives	Consideration of alternative routes generally applies to linear developments such as power lines, transport, and pipeline routes. **Therefore, this alternative is not considered feasible and will not be discussed further in this report.**
Site layout alternatives	Site layout alternatives permit consideration of different spatial configurations of an activity on a particular site. This may include particular components of a proposed development or may include the entire activity. One site layout has been developed for the RCM project. **Therefore, this alternative is not considered feasible and will not be discussed further in this report.**
Scale alternatives	In some cases, activities that can be broken down into smaller units can be undertaken on different scales. For example, a housing development within an overall mixed-used development could have the option of 1 000, 2 000 or 4 000 housing units. Each of these scale alternatives may have different impacts. No scale alternatives have been identified. **Therefore, this alternative is not considered feasible and will not be discussed further in this report.**
Design alternatives	This entails the consideration of different designs for aesthetic purposes or different construction materials to optimise local benefits and sustainability would constitute design alternatives. Appropriate applications of design alternatives are communication towers. In such cases, all designs are assumed to have different impacts. Generally, the design alternatives could be incorporated into the project proposal and so be part of the project description and need not be evaluated as separate alternatives. Based on project description and background information, engineering designs are still under assessment. **Therefore, this alternative is not considered feasible and will not be discussed further in this report**.
Operational alternatives	The Operational Alternative is where you can specify controls on the operational aspects of the project such as pressure pipes, pumps, as well as valves. In the case of the proposed expansion, **feasible operational alternatives were not identified and are not discussed in this report.**

5.1 NO-GO ALTERNATIVE

The “No Go” or “No Action” alternative refers to the alternative of not embarking on the proposed project at all. It assumes that the activity does not go ahead, implying a continuation of the current situation or the status quo. It is important to note that the No Go alternative is the baseline against which all other alternatives and the development proposal are assessed. When considering the No Go alternative, the impacts (both positive and negative) associated with any other specific alternative, or the current project proposal would not occur and in effect the impacts of the No Go alternative are therefore inadvertently assessed by assessing the other alternatives. In addition to the direct implications of retaining the status quo, there are certain other indirect impacts, which may occur should the No Go alternative be followed. The ‘no-go’ alternative provides the means to compare the impacts of project alternatives with the scenario of a project not going ahead. In evaluating the ‘no-go’ alternative it is important to take into account the implications of foregoing the benefits of the proposed project.

The no-go alternative implies that once the remaining resources in the current approved underground and opencast mining areas at RCM are fully extracted and the sites rehabilitated, mining operations will cease entirely. This scenario assumes that the proposed project does not proceed. The option of the project not proceeding means that both negative and positive impacts would not take place. No further environmental degradation will take place. With no continuation of mining, negative impacts on biodiversity, water resources, and surrounding ecosystems would be avoided. Conversely, the positive impacts associated with ongoing mining operations for e.g. sustained employment, economic activity and community support will also be lost. A significant number of jobs would be lost, affecting employees, contractors, and local communities dependent on the mine. The halt in operations could lead to reduced local and regional economic stability, especially in areas reliant on mining-related income. Therefore, this alternative is not recommended provided that the recommendations and mitigation measures indicated in the Environmental Management Programme (Appendix H) and any other conditions stipulated by the competent authority are adhered to.

5.2 PROCESS ALTERNATIVES

Process alternatives imply the investigation of alternative processes or technologies that can be used to achieve the same goal. This includes using environmentally friendly designs or materials and re-using scarce resources like water and non-renewable energy sources. Mining sequence and scheduling alternatives may be considered. Specific to this project, two methods of chrome mining area applicable and assessed below.

5.2.1 OPEN-CAST AND STRIP MINING

Open-cast / open-pit mining is a surface mining technique that extracts minerals or rock from a large, open-pit excavation in the ground, used when deposits are near the surface. This method involves removing layers of the earth, often using explosives, and creating a stepped, bench-like structure to access the ore below. It is a common and productive method for extracting both metallic and non-metallic ores and is also known as open cast mining or open cut mining. Large-scale open-pit mines are dug using methods similar to those used for other minerals. Hydraulic shovels and large cable shovels are commonly used to dig and load the ore into haul trucks. The extracted ore is transported from the pit to a processing plant

Open pit mining for chrome involves excavating large, open-cut mines to extract chromite ore, which is primarily used to produce stainless steel and other chrome-based products. This method is often used for shallow deposits, like those found in South Africa's Bushveld Igneous Complex, where operations use large excavators and trucks to remove ore. The advantages and disadvantages of open-cast mining are provided in Table 10.

5.2.2 UNDERGROUND MINING

Underground mining is the process of extracting minerals from deep beneath the Earth's surface by creating tunnels and shafts to access ore deposits. It is used when mineral deposits are too deep for surface mining and involves drilling, blasting, or cutting the ore, and then transporting it to the surface via hoists, conveyor belts, or carts. Methods vary depending on the type of deposit and include techniques like room and pillar, longwall mining, and block caving. Tunnels or shafts are created to reach the mineral deposit. Once the ore body is

reached, it is extracted using drilling, blasting, or cutting methods. The extracted material is moved to the surface for processing using various systems, such as hoists, conveyor belts, or carts.

Underground chrome mining involves extracting chromite ore from below the surface, often through shafts and tunnels, and is primarily conducted in South Africa, where most of the world's chrome reserves are located. This method is more expensive than open-pit mining and requires significant infrastructure for ventilation, dewatering, and structural support, as seen in operations like the Dwarsrivier and Western Chrome Mines. The advantages and disadvantages of underground mining are provided in Table 10.

Table 10: Advantages and disadvantages of mining process alternative for chrome

ADVANTAGE	DISADVANTAGE
Open Pit Mining for Chrome	
Allows for a more complete recovery of the ore body (up to 100%) as the entire deposit is exposed.	Requires the removal of large amounts of overburden, disturbing large surface areas, natural habitats, and potentially causing soil erosion and water contamination
Considered safer than underground mining due to better visibility, easier access for emergency evacuation, and no risks of cave-ins or gas explosions inherent to underground operations	Becomes less economical as the deposit gets deeper due to increasing stripping ratios and haulage costs
Can be brought to full production in a shorter timeframe	Operations can be impacted by adverse weather conditions
Generally less expensive due to the use of large, high-capacity equipment (shovels, large trucks), which results in high productivity and lower unit costs	Operations generate considerable surface noise and air pollution, affecting nearby communities and potentially leading to stricter regulations
Poses a lesser risk through acid mine drainage or chemical leaks	The resulting large pits create a significant and permanent visual scar on the landscape
Open-pit mines can be repurposed for various uses, which is generally not an option for underground mines	
Underground Mining for Chrome	
Causes less surface habitat destruction and has a much smaller surface footprint, with significantly less land cleared for excavation	Poses a risk through acid mine drainage or chemical leaks, with the effects being less visible but potentially longer lasting
Allows extraction of ore bodies located too deep for open pit methods to be viable	Cause greater risks of pollution to underground systems
Causes minimal disturbance to the surface ecosystem, making it suitable for ecologically sensitive areas	The use of smaller equipment and more complex logistics generally leads to lower daily production rates compared to large open pits

ADVANTAGE	DISADVANTAGE
Can be more selective in targeting high-grade ore, minimizing waste production	Some ore must be left in place to form pillars for structural support, reducing the total recovery percentage
Surface operations are minimal, resulting in less noise and air pollution compared to open-pit mine	Poses greater safety challenges for workers due to confined spaces, potential ground instability, and the presence of toxic gases
	Underground mine closure often requires dewatering infrastructure to be shut down and managing the re-filling of underground voids with groundwater

Based on the advantages and disadvantages indicated above, open-cast mining appears to be immediate surface environmental impacts than underground chrome mining. However, underground chrome mines can have severe and longer lasting impacts on groundwater and ecosystems. In addition, underground chrome mining requires a longer and more extensive closure and rehabilitation process. Therefore, **open-pit chrome mining can be recommended**.

6 PUBLIC PARTICIPATION PROCESS

The Public Participation Process (PPP) is a requirement of several pieces of South African legislation and aims to ensure that all relevant Interested and Affected Parties (I&APs) are consulted, involved and their comments are considered, and a record included in the reports submitted to the Authorities. The process ensures that all stakeholders are provided this opportunity as part of a transparent process which allows for a robust and comprehensive environmental study. The PPP for the proposed project needs to be managed sensitively and according to best practises to ensure and promote:

- Compliance with international best practice options;
- Compliance with national legislation;
- Establishment and management of relationships with key stakeholder groups; and
- Involvement and participation in the environmental study and authorisation/approval process.

As such, the purpose of the PPP and stakeholder engagement process is to:

- Introduce the proposed project;
- Explain the authorisations required;
- Explain the environmental studies already completed and yet to be undertaken (where applicable);
- Solicit and record any issues, concerns, suggestions, and objections to the project;
- Provide opportunity for input and gathering of local knowledge;
- Establish and formalise lines of communication between the I&APs and the project team;
- Identify all significant issues for the project; and

Identify possible mitigation measures or environmental management plans to minimise and/or prevent negative environmental impacts and maximize and/or promote positive environmental impacts associated with the project.

6.1 PRE-CONSULTATION WITH THE COMPETENT AUTHORITY

A pre-application meeting with the competent authority (DMPR) was held on the 4th of November 2025. The purpose of the pre-consultation was to provide the authorities with background information of the proposed project, confirm NEMA EIA triggered listed activities, the process to be followed and plan of study for project such as specialist studies and public participation.

6.2 GENERAL APPROACH TO THE PUBLIC PARTICIPATION

The PPP for the proposed project has been undertaken in accordance with the requirements of the MPRDA and NEMA EIA Regulations (2014), and in line with the principles of Integrated Environmental Management (IEM). IEM implies an open and transparent participatory process, whereby stakeholders and other I&APs are afforded an opportunity to comment on the project and have their views considered and included as part of project planning.

6.3 IDENTIFICATION OF I&APS

An initial I&AP list was compiled using existing databases, GIS analysis and WinDeed searches to determine the contact details of the registered landowners of the project affected properties and surrounding properties. The I&AP database includes amongst others: landowners, communities, regulatory authorities, and other specialist interest groups. Additional I&APs have been registered during the initial notification and call to register period. The I&AP database has been continuously updated throughout the duration of the BA process. A full list of I&APs is attached in Appendix C.

6.4 LIST OF AUTHORITIES IDENTIFIED AND NOTIFIED

The following authorities have been identified and notified, but not limited to:

- Rustenburg Local Municipality (Municipality as well as relevant Ward Councillor/s);
- Bojanala Platinum District Municipality;
- National Department of Agriculture, Land Reform and Rural Development;
- National Department of Co-operative Governance and Traditional Affairs;
- National Department of Mineral and Petroleum Resources (DMPR) (Competent Authority);
- National Department of Rural Development and Land Affairs;
- National Department of Transport;
- National Department of Water and Sanitation;
- North West Department of Minerals and Energy;
- North West Development Corporation Soc Ltd;
- North West Parks Board;
- North West Provincial Government: Department of Economic Development, Environment, Conservation and Tourism;
- North West Provincial Heritage Resources Authority;
- North West Wetland Forum.
- Council of Geoscience;
- Magaliesberg Biosphere Management Authority;

- National Nuclear Regulator;
- National Roads Agency;
- Agricultural Research Council;
- National Transmission Company of South Africa;
- South African Heritage Resources Agency (SAHRA);
- South African National Biodiversity Institute (SANBI);
- South African Civil Aviation Authority (CAA);
- South African National Parks (SANPARKS);
- Transnet Soc Ltd;
- National Transmission Company South Africa (NTCSA); and

6.5 LIST OF KEY STAKEHOLDERS IDENTIFIED AND NOTIFIED

The following key stakeholders have been identified and notified of the proposed activity:

- BirdLife South Africa;
- Botanical Society;
- Centre for Environmental Rights;
- Conservation South Africa (CSA);
- Earth Life Africa;
- Endangered Wildlife Trust;
- Federation for a Sustainable Environment;
- GroundWork SA;
- Mining Affected Communities United in Action (MACUA);
- Mining and Environmental Justice Community Network of South Africa;
- Natural Justice;
- WESSA;
- World Wildlife Fund; and
- Agri SA.

Refer to Appendix C for the full list of I&APs.

6.6 NOTIFICATION TO I&APS

The PPP commenced on the 27th of November 2025. All I&APs were notified of the project via the following one or more of the following methods Initial call to register:

- Newspaper Advertisement: Placement of advertisement in English and Setstwana in the Rustenburg Herald Newspaper and Afrikaans in the Platinum Weekly Newspaper with circulation in the vicinity of the study area on the 27th of November 2025.

- Government Gazette: A Gazette Notice in English was placed in the North West Provincial Gazette on the of 02 December 2025.
- Placement of site notices: Ten (6) A1 correx board site notices (in English and Afrikaans and or English and Setswana) were placed at ten (6) locations around the proposed project study area on the 27th of November 2025.
- Notification of landowners, occupiers and other key I&APs: Notification letters, were distributed to pre-identified I&APs through either email, fax, and/or registered mail where contacts were available were circulated on the 27th of November 2025.

The notification documents included inter alia the following information:

- Authorisations required;
- Sufficient detail of the proposed development to enable I&APs to assess/surmise what impact the development will have on them or the use of their land;
- The purpose of the proposed project;
- Details of the application processes associated with proposed activities;
- Details of the affected properties;
- Details of the South African environmental legislation that must be adhered to; and
- Contact details of the EAP.

Refer to Appendix C for proof of notification sent to I&APs and for proof of correspondence with I&APs. The following will still be conducted.

Table 11: PPP still to be conducted

NOTIFICATION	DETAILS
Availability of BAR for public review Reports (Basic Assessment Report) **This BAR are being made available for public review and comment for a period of 30-days from the 27h of January 2026 to the 26th of February 2026.**	I&APs will again be notified in the following way regarding the application and the availability of the BAR and EMPr for review: • Newspaper Advertisement: Placement of advertisement in English, Setswana and Afrikaans in the Rustenburg Herald Newspaper and the Platinum Weekly Newspaper with circulation in the vicinity of the study area. • Government Gazette: A Gazette Notice in English, Setswana and Afrikaans to be placed in the North West Provincial Gazette. • Placement of site notices: Ten (10) A1 correx board site notices (in English, Setstwana and or Afrikaans) to be placed at ten (10) locations around the proposed project study area. • Notification of landowners, occupiers and other key I&APs: Notification letters, were distributed to pre-identified I&APs through either email, fax, and/or registered mail where contacts are available to be circulated.
	One (1) hard copy of report will be submitted to local public library where members of the public can access the report.
	An electronic copy of the report has been placed on the EIMS website (https://www.eims.co.za/public-participation/). A data free service can be made available to anyone who has limitations with respect to data downloads.
Notification of Decision and Appeal Process	After a decision has been reached by DMRE, Chapter 2 of the National Appeal Regulations 2014 makes provision for any affected person to appeal against the decision. Within 20 days of being notified of the decision by the competent authority, the appellant must submit the appeal to the appeal administrator. An appeal panel may be appointed at the discretion of the delegated or organ of state to handle the case and it would then submit its recommendations to that organ of state for a final decision on the appeal to be reached. EIMS will communicate the decision of the Provincial Authority and the way appeals should be submitted to the Minister and to all I&APs as soon as reasonably possible after the final decision has been received Notification to registered I&APs will be via either through email, fax, SMS and registered mail where contacts are available.

Comments obtained during the BAR public review and comment period and the responses will be included in the final submission to DMPR.

6.7 SUMMARY OF ISSUES RAISED BY I&APS

Comments raised will be addressed in a transparent manner and included in the Public Participation Report. To All comments received during the initial PPP will be included in Appendix C as the table of correspondence of this report with the Final Submission.

7 THE ENVIRONMENTAL ATTRIBUTES AND BASELINE ENVIRONMENT

This section of the BA Report provides a description of the environment that may be affected by the proposed project. Aspects of the biophysical, social and economic environment that could be directly or indirectly affected by, or could affect, the proposed development have been described. This information has been sourced from existing information available for the area and where relevant with input from various specialists that were appointed to undertake the specialist assessments for the application area. Refer to Appendix F copies of the specialist reports undertaken. The following specialist studies were undertaken:

- Geohydrological Assessment – Hydrogeek Consulting.
- Aquatics and Wetland Compliance Statement – The Biodiversity Company.
- Terrestrial Biodiversity Compliance Statement – The Biodiversity Company.
- Soils and Agricultural Compliance Statement - The Biodiversity Company.

Rustenburg Chrome Mine (Pty) Ltd (RCM), is located Northwest of Pretoria, 7 kilometres (km) east of Kroondal and 20 km south-east of Rustenburg and falls within the Bojanala Platinum District Municipality, North West Province (Figure 1). The existing operation consists of:

- Tailings Storage Facilities (TSF);
- Waste Rock Dumps (WRD);
- Dams;
- Stockpiles;
- Concentrators;
- Landfill Sites;;
- Underground and Opencast mining; and
- Shafts.

This EA application is only for the expansion of the current opencast pit.

7.1 TOPOGRAPHY

The natural landscape of the study area is characterised by a rolling topography, with an increase in height toward the Magalies Mountains approximately 8 km to the south (Airshed, 2025). The elevation of the study area ranges from 1130 metres above mean sea level (mamsl) to 1150 mamsl (Hydrogeek, 2025). Refer to Figure 21).

7.2 GEOLOGY AND MINING

The regional geology of the area is given in Figure 5 and Figure 8. The regional area is underlain by the Ruighoek pyroxenite, Mathlagame norite, Mathlagame norite anorthosite and Kroondal Norite of the Rusten-burg Layered Suite, Bushveld Complex, Vaalian Era. The soil cover on the site consists of a dark brown to black, firm loamy clay with abundant vegetation roots. This soil is dispersive and expansive and forms large cracks when moisture is driven off. Locally the soil is referred to as black “turf”.

Generally, it should be noted that the geology of site has been artificially modified in areas due to mining activities surrounding the site. This artificially modification of the geology could possibly have an impact on the hydraulic properties of groundwater flow in the subsurface. A simplified description of the units underlying the study area is represented. The ore body is in the Critical zone of the Rustenburg Layered suite in the Bushveld

Ingenious Complex (BIC). The area strikes east-west and dip10 degrees to the north. The chrome layers are interlayered by pyroxenites, norites and anorthosites.

The faults are predominantly dextral, many of which have later been intruded by dykes. The majority of the dykes have a north-north-west strike and form part of the Pilanesberg dyke swarm. A major dyke flanks the western portion of the study area and is associated with a major fault in the area and constitutes the most noticeable topographic feature.

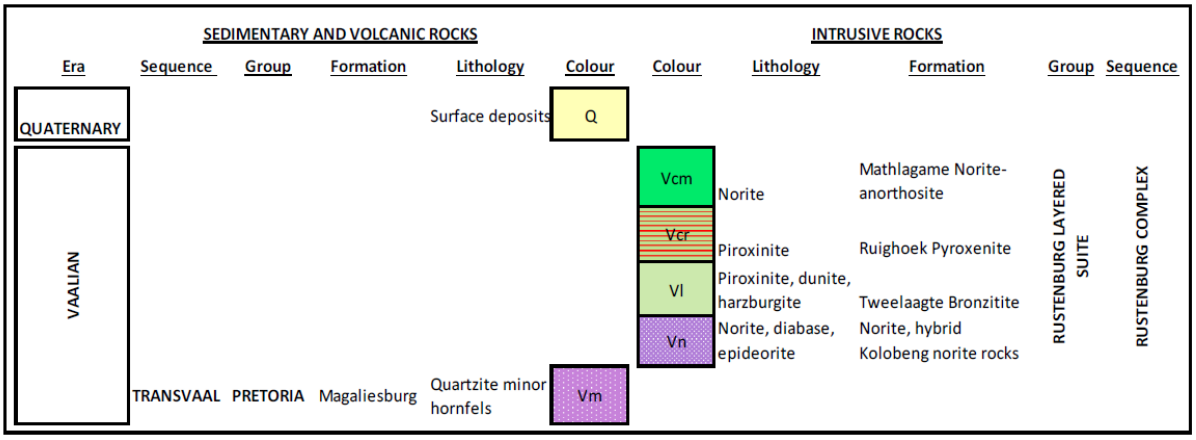


Figure 5: Geology groups present (Hydrogeek, 2025)

The figure below (Figure 6) presents the topographic surface of the proposed Area 3 pit expansion. Elevations range from approximately 1,120 mamsl (blue) in the lower-lying zones to 1,240 mamsl (red) at the highest points. The Area 3 expansion occurs along the northern edge of the existing open pit. Potential link to the future underground from this area needs to be confirmed as this will affect the closure scenarios and future abstraction requirements of this pit.

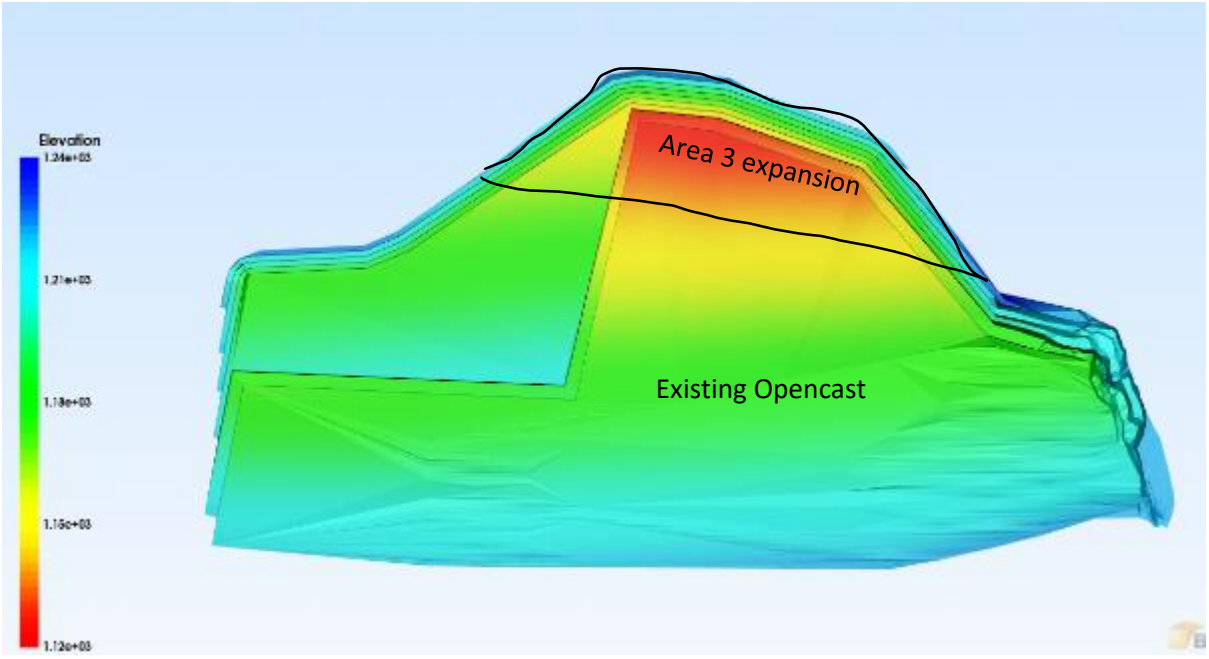


Figure 6: Area 3 expansion (Hydrogeek Consulting 2025)

The long term planned pit development sequence includes phased operations between 2025 and 2035, with nine new pits (of which Area 3 or Pit 3 (this application) is a part of), (refer to Figure 9) each pit is associated with a designated Hanging Well (HW) depth that will serve as the reference for the final pit depth (Table 12 and Figure 7). Pit 1-4 (of which Pit 3 (this application) is a part of) is scheduled to start in 2026, progressing to a final depth of 127 m, with mining concluding by July 2031. Pit 5, a relatively short-lived operation, will be developed

from January to July 2028, reaching a final depth of 60 m. Pit 6 is the deepest of the sequence at 140 m, commencing in August 2028 and continuing until July 2038. Pit 8 will extend to 94 m, operating between August 2031 and August 2033, while Pit 9, with a final depth of 82 m, is planned to run from October 2033 to June 2035.

The staged sequencing of these pits, with varying final depths, demonstrates a strategic progression of mining areas that ensures continuous production and allows for resource scheduling around depth target.

Table 12: Pit plans 2025-2038 (Hydrogeek Consulting 2025)

Pit	Final HW (m)	Start	End	Duration (days)	Duration (months)	Duration (years)
Pit 1-4	**127,0**	**2022/01/01**	**2031/07/31**	**3498,0**	**116,6**	**9,7**
Pit 5	60,0	2028/01/28	2028/07/31	185,0	6.0	0,5
Pit 6	140,0	2028/08/01	2038/07/01	3621,0	119.0	9,9
Pit 7	12,0	2031/08/01	2031/12/31	120,0	4,0	0,3
Pit 8	94,0	2031/01/01	2034/01/01	1096,0	36,5	3,0
Pit 9	82,0	2033/10/01	2035/06/01	608,0	20.0	1,7

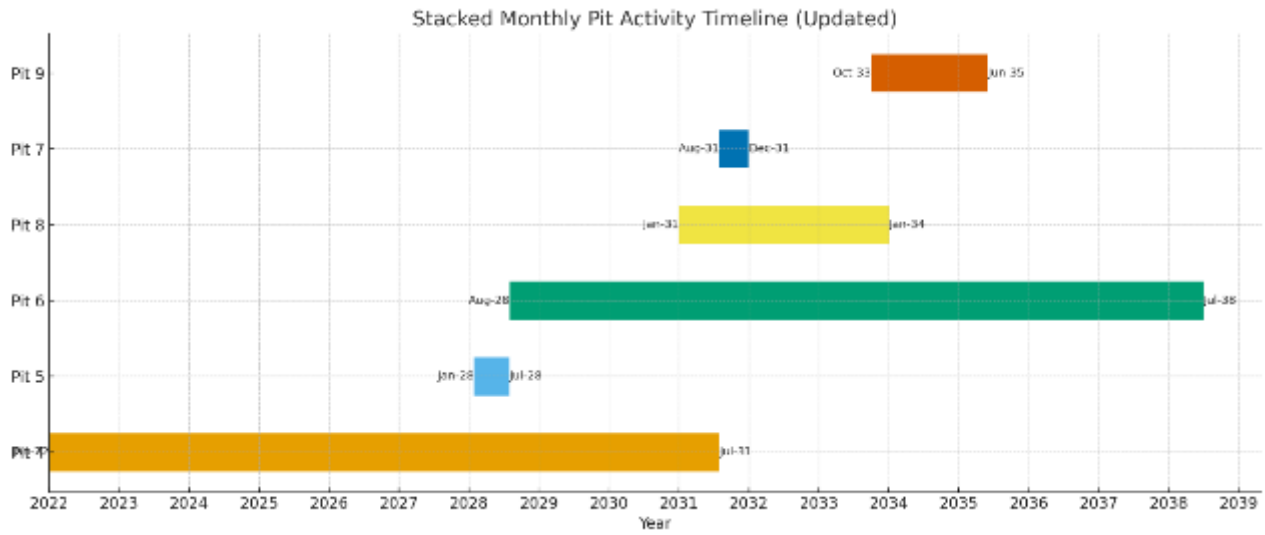


Figure 7: Pit Timeline (Hydrogeek Consulting 2025)

With the focus on Area 3, which is the expansion of the current pit towards the north. The impact of the pit 5 and pit 6 will also affect the groundwater.

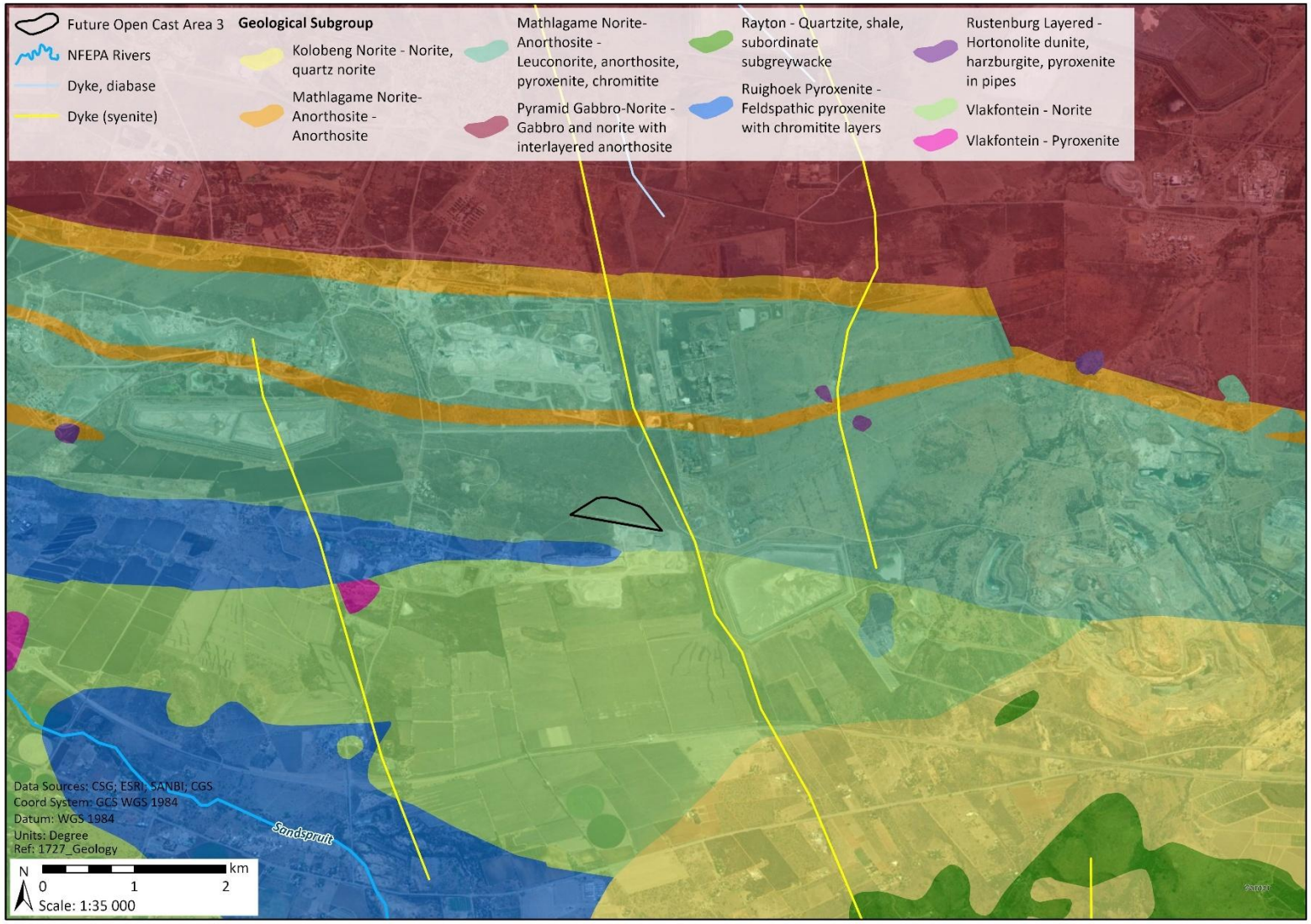


Figure 8: Simplified Geology of the mining area

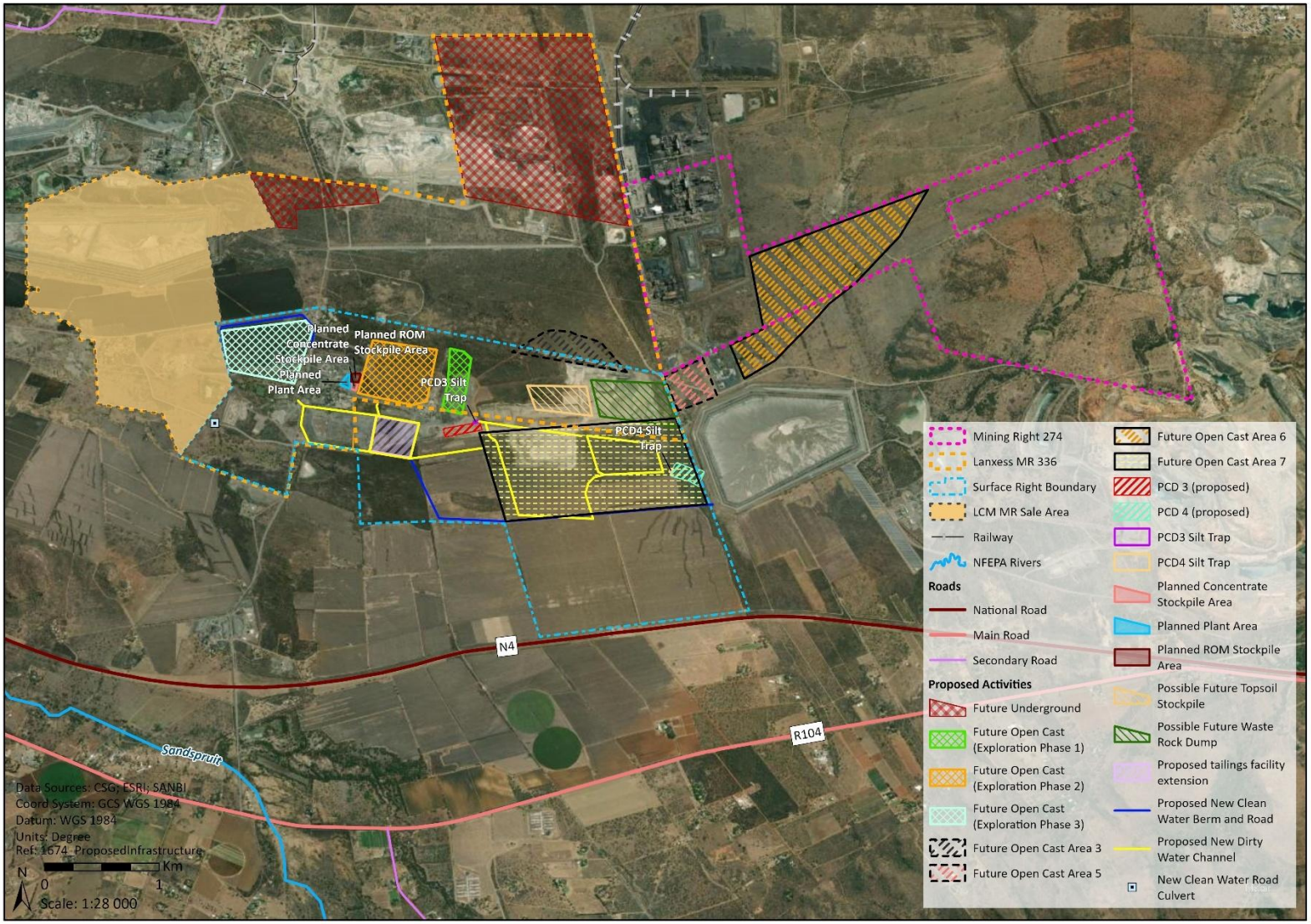


Figure 9: Long term mining and infrastructure plan with potential new mining pit areas

7.3 SOILS AND LAND CAPABILITY

Soil information was obtained using published South African Land Type Data. Land type data for the site was obtained from the Institute for Soil Climate and Water (ISCW) of the Agricultural Research Council (ARC) (Land Type Survey Staff, 1972 - 2006). The land type data is presented at a scale of 1:250 000 and comprises of the division of land into land types (Figure 10). According to the land type database (Land Type Survey Staff, 1972 – 2006) the development primarily falls within the Ea3, Bc8 and Ib116 land type.

The geology of the area includes mafic intrusive rocks of the Rustenburg layered suite of the Bushveld Igneous Complex, gabbro, norite, pyroxenite, anorthosite, shales and quartzites. According to the land type database (Land Type Survey Staff, 1972 - 2006) the transects relevant to the project is located in the Ea 3 (see Figure 10). The Ea 3 land type mainly consists of Arcadia, Oakleaf soil forms and rocky areas. The Ea land type is characterised by vertic, melanic, red-structured diagnostic horizons and undifferentiated soils.

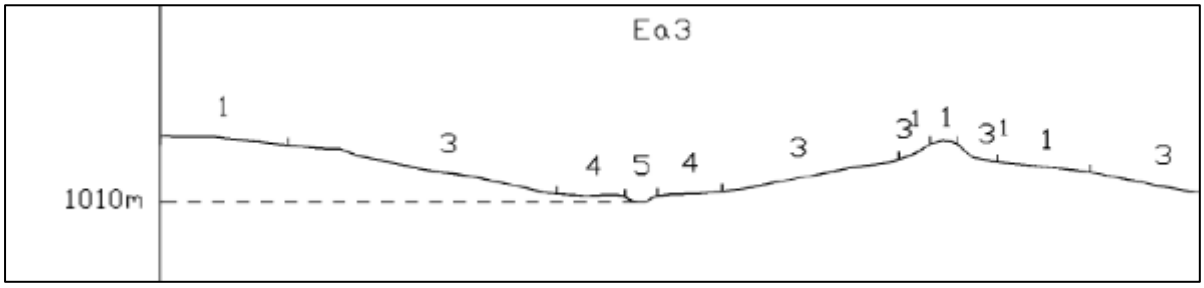


Figure 10: Illustration of land type Ea 3 terrain units (Land Type Survey Staff, 1972 - 2006).

The Ea land type is characterised by vertic, melanic, red-structured diagnostic horizons and undifferentiated soils. The Ib land types have miscellaneous land classes and soils with rocky areas being dominant in the terrain. The Bc land type is characterised by plinthic catena.

The Ea3 land type mainly consists of Arcadia, Oakleaf soil forms and rocky areas, according to the Soil classification working group (1991), with the occurrence of other soils within the landscape. The Ib 116 land type mainly consists of Arcadia and Rensburg soil forms, with rocky areas, associated with the occurrence of other soils in the landscape. The Bc land type is distinguished by a plinthic catena, where the soil profile exhibits a sequence of horizons with varying degrees of iron and manganese concretions. Upland duplex and margalitic soils are infrequent within this classification, while eutrophic red soils are extensively distributed, contributing to the nutrient-rich nature of the area.

The following soil forms were identified on-site whilst surveying the project area;

- Arcadia (Vertic topsoil on top of a lithic horizon below);
- Rustenburg (Vertic topsoil on top of a Hardrock substratum below);
- Mispah (Orthic topsoil on top of a hard rock layer below); and
- Witbank (Transported anthropogenic material from mining activities with some evidence of the original diagnostic horizons or partially processed saprolithic material

Refer to Figure 11Figure 12 and Figure 12Figure 13 for the representative of the soil forms and to Figure 13 for the diagnostic soil horizons identified on-site.

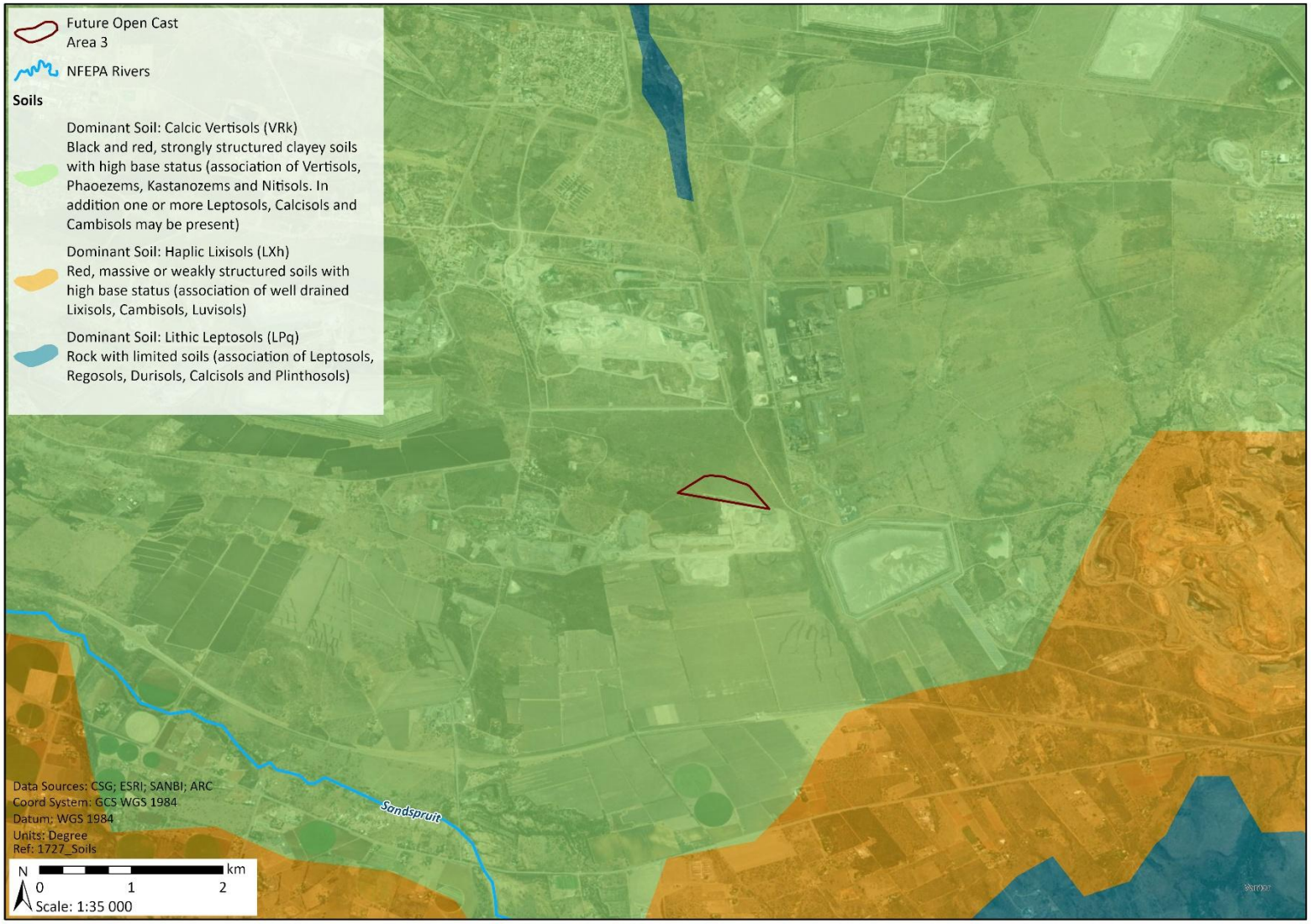


Figure 11: Simplified soils of the study area

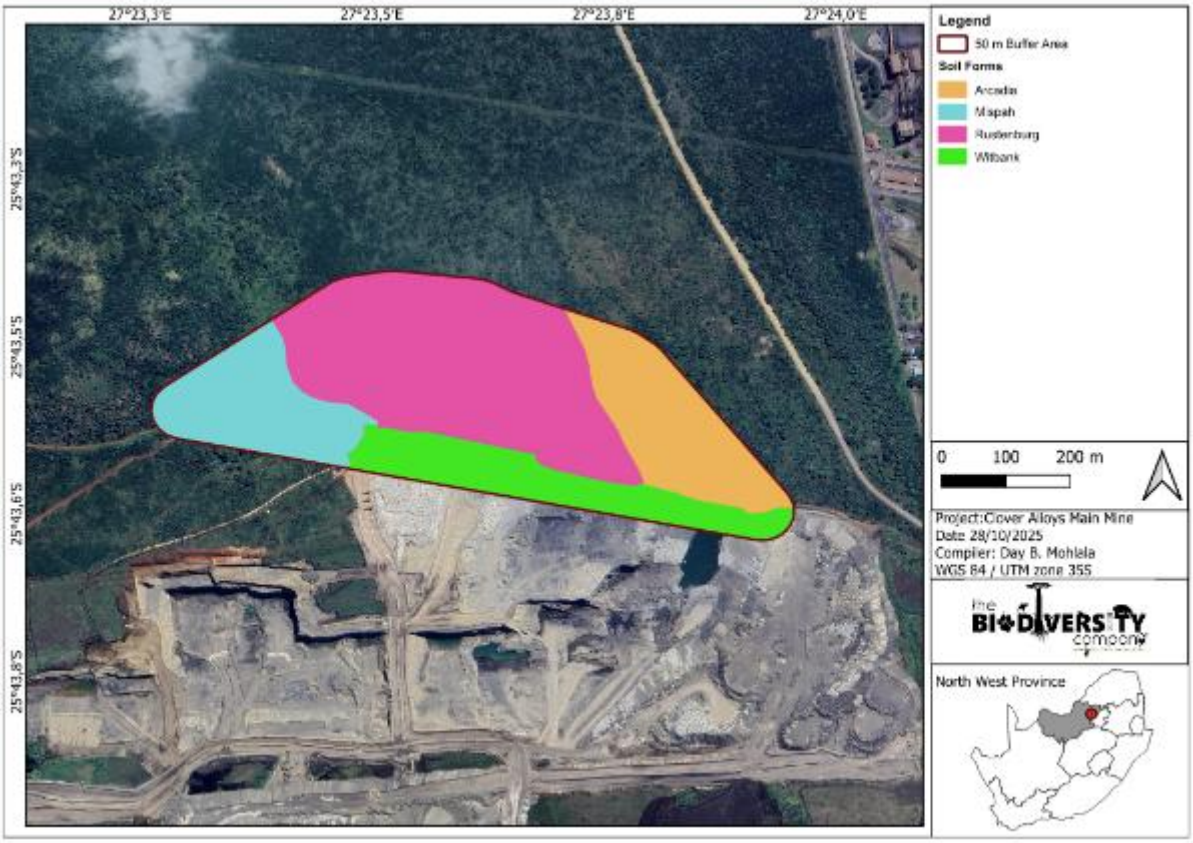


Figure 12: Soil forms identified within representative hillslope transects (The Biodiversity Company, 2025)

Figure 13: Diagnostic soil horizons identified on-site: A) Mispah. B) Witbank soil form. C) Acadia soil form. F) Orthic topsoil horizon with a lithic horizon (The Biodiversity Company, 2025)

According to the National Web-based Environmental Screening Tool (Appendix D), Agriculture Theme Sensitivity indicates that the proposed project area falls within the "*Low to Very High*" agricultural sensitivity. The soil scientist disputes the findings and assesses the study area to have a Land Capability of *Low-Moderate*. The presence of medium potential soil with some restrictions in drainage, aeration, root penetration and high-water holding capacity such as Arcadia soil form. The specialist concludes proposed development area, the overall

sensitivity of the proposed project area is predominantly "*Low"* with marginal "*Medium*" sensitivity (refer to Figure 14).

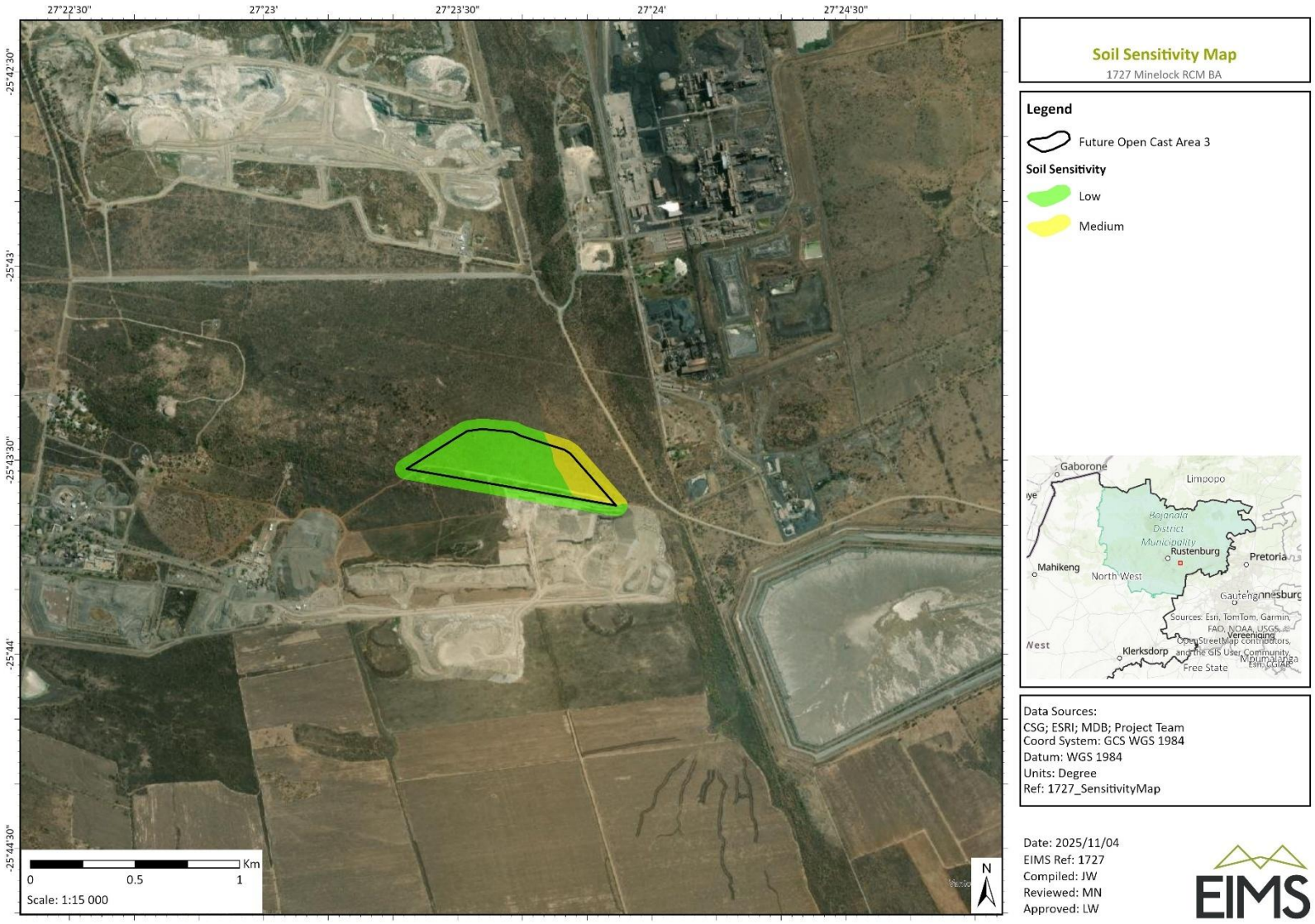


Figure 14: Overall soil sensitivity of the project area (The Biodiversity Company, 2025)

7.4 CLIMATE AND WEATHER

7.4.1 SURFACE WIND

The wind field determines both the distance of downward transport and the rate of dilution of pollutants. The generation of mechanical turbulence is a function of the wind speed, in combination with the surface roughness. The wind field for the study area is described with the use of wind roses. Wind roses comprise 16 spokes, which represent the directions from which winds blew during a specific period. The colours used in the wind roses below, reflect the different categories of wind speeds; the yellow area, for example, representing winds in between 4 and 5 m/s. The dotted circles provide information regarding the frequency of occurrence of wind speed and direction categories. Calm conditions are periods when the wind speed was below 1 m/s. These low values can be due to "meteorological" calm conditions when there is no air movement; or, when there may be wind, but it is below the anemometer starting threshold.

The period wind field and diurnal variability in the wind field are shown in Figure 15. The average wind field is mainly from the north-to-east-to south half of the wind grid with calm conditions 2.52% of the time. The daytime wind field is mainly from the north, ranging between north-west to north-east with 1.75% calm conditions. During the night, the wind field shifts to the south and south-southeast with less frequent winds from the south-westerly to north-westerly sector. The frequency of night-time calm conditions increases to 3.30%.

A distinct seasonal variation in the wind field in visible from Figure 16. During summer, the wind field is varied between most directions with more frequent winds from the north-eastern sector. The wind field shifts to south during autumn, with more frequent southerly winds during winter. During spring, the northerly winds increase with frequent north to north-east winds.

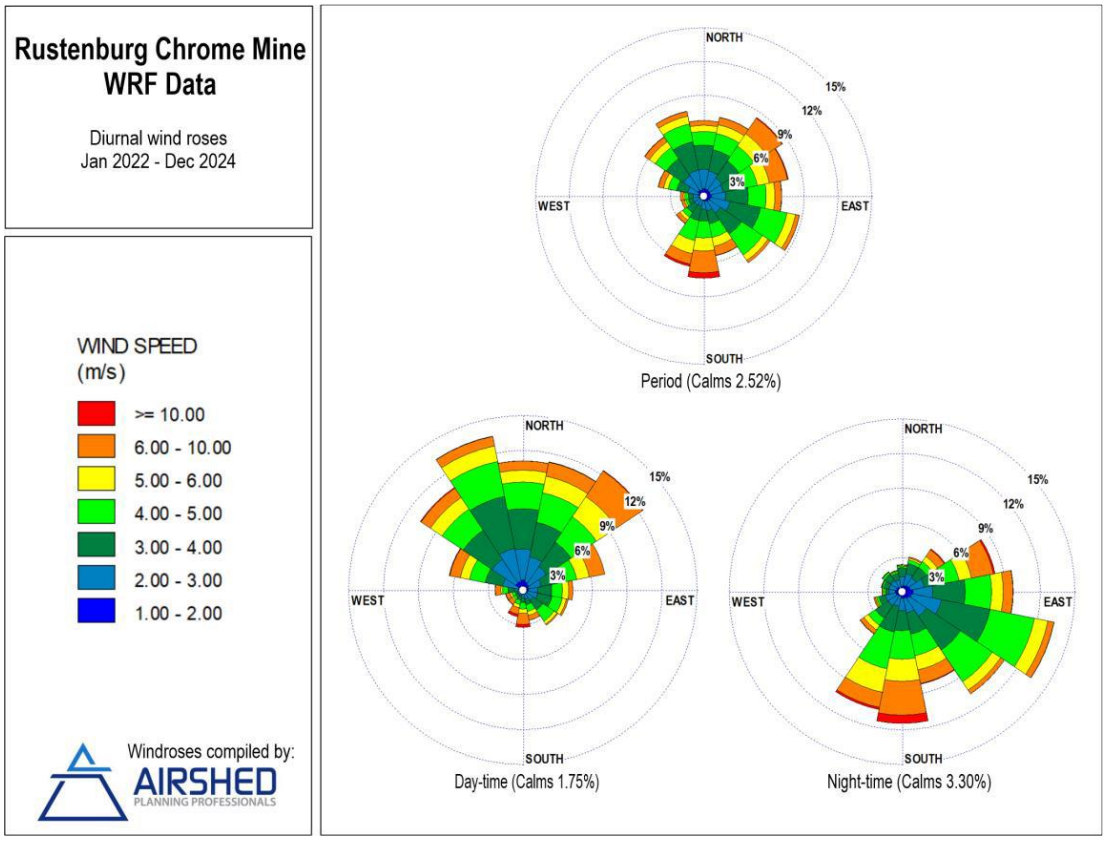


Figure 15: Period, day- and night-time wind roses (WRF data; 2022 to 2024)

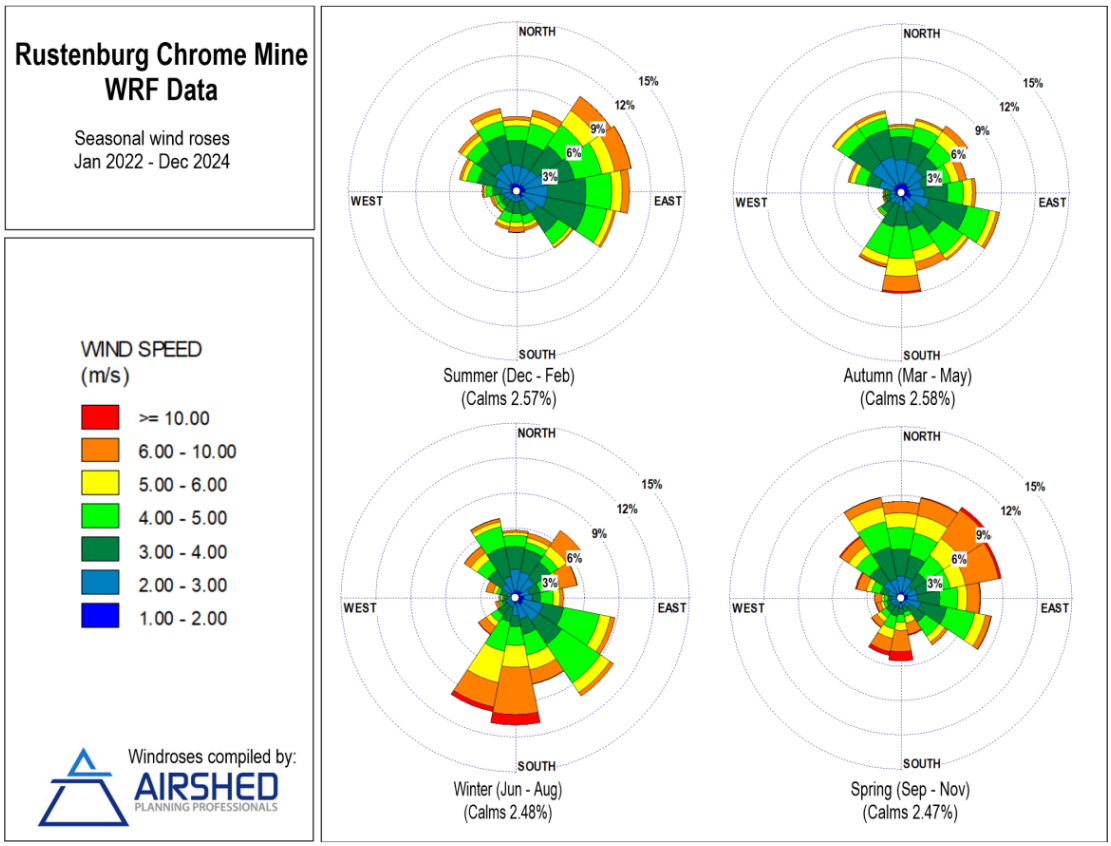


Figure 16: Seasonal wind roses (WRF data; 2022 to 2024).

According to the Beaufort wind force scale, wind speeds between 6-8 m/s equates to a moderate breeze, with wind speeds between 14-17 m/s near gale force winds. Based on the three years of WRF data, range between 0.3 m/s to 15.2 m/s, with an average wind speed of 4 m/s. The likelihood for wind erosion to occur from open and exposed surfaces, with loose fine material, was estimated when the wind speed exceeds 8 m/s. The US EPA indicates wind erosion from stockpiles to occur when winds exceed 5.4 m/s. Wind speeds exceeding 8 m/s and 5.4 m/s occurred for 4% and 18%, respectively over the period.

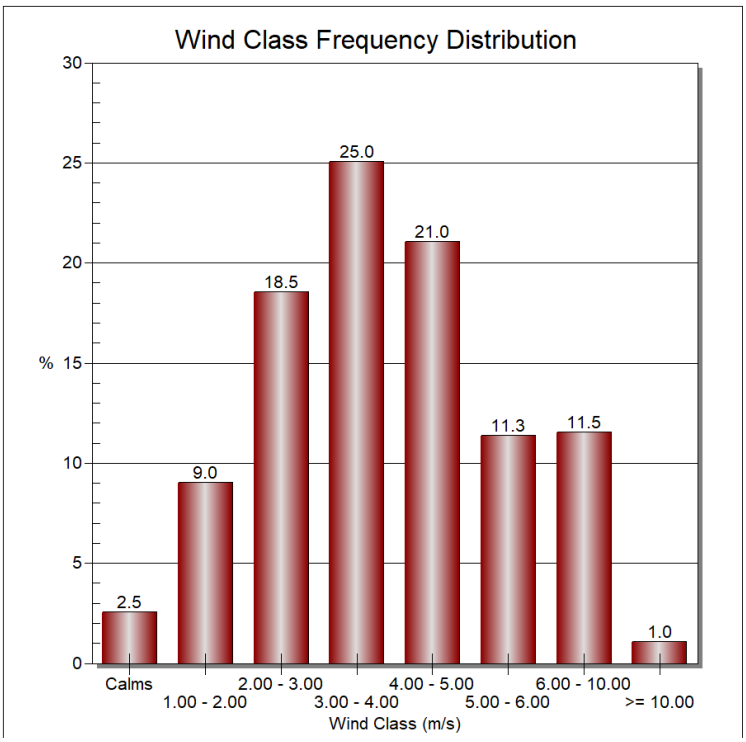


Figure 17: Wind speed categories (WRF data; 2022 to 2024)

7.4.2 AMBIENT TEMPERATURE

Air temperature is important, both for determining the effect of plume buoyancy (the larger the temperature difference between the plume and the ambient air, the higher a pollution plume is able to rise and determining the development of the mixing and inversion layers). The monthly temperature pattern is provided in Figure 18 with the diurnal temperature profile in Figure 19. The area experiences hot temperatures during summer, with maximums of above 36°C for the months between November and March. Winter temperatures are relatively low especially in the months of May to July, with a minimum of -2.6°C in July.

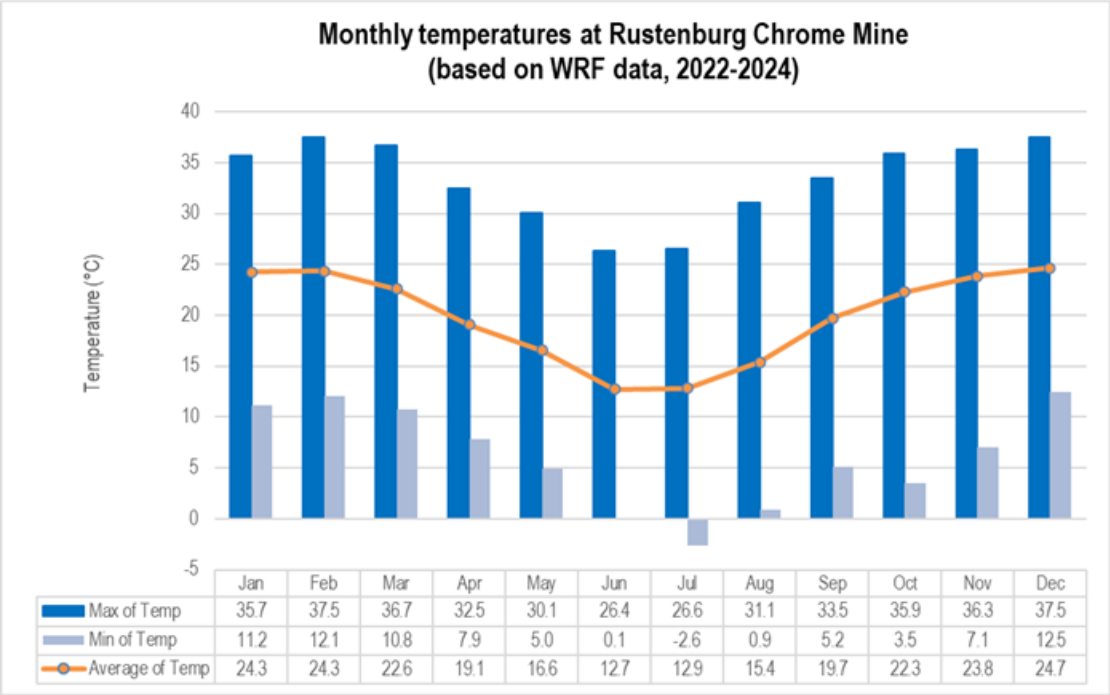


Figure 18: Minimum, average and maximum temperatures (WRF data; 2022 to 2024)

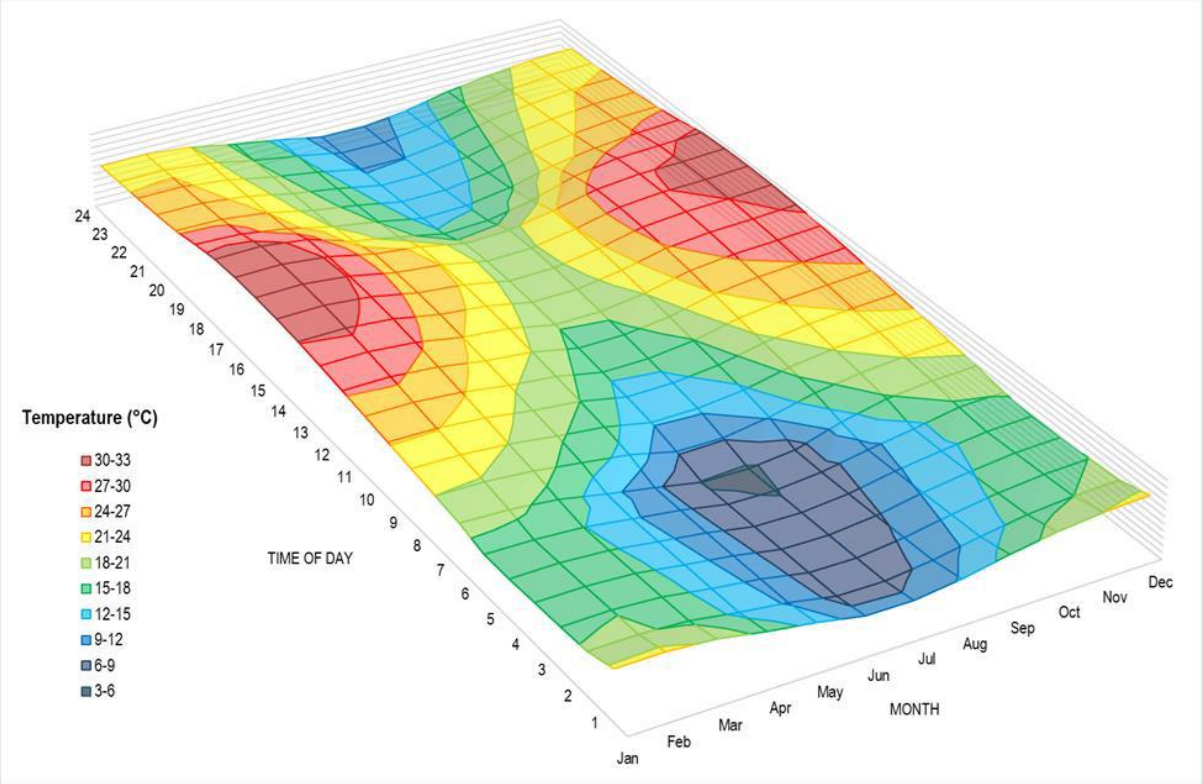


Figure 19: Diurnal temperature profile (WRF data; 2022 to 2024)

7.4.3 PRECIPITATION

The study area is located within the middle-veld climatic zone, characterized by hot summers and mild winters. The Regional Mean Annual Precipitation (MAP) in the area typically varies, with an average annual rainfall of approximately 633 mm. Precipitation predominantly occurs during the summer months, in the form of high-intensity, short-duration thunderstorms. These storms are most frequent between November and March, with the peak rainfall typically recorded in January.

To evaluate the local rainfall patterns, daily rainfall data was sourced from the Computing Centre for Water Research (CCWR) database, University of Natal. Specifically, the data from CCWR gauge 0511672, located 4 km northwest of the mine at Klipfontein, was utilized. The provided records span 73 years of recorded and patched daily data, offering a comprehensive dataset that is representative of the rainfall conditions at the mine site. The long-term dataset allows for robust analysis of historical rainfall trends and provides a solid foundation for hydrological modeling and water management strategies in the region.

This rainfall data is crucial for understanding the temporal distribution and intensity of precipitation events, which can impact both surface and groundwater dynamics in the area. The information will aid in assessing water inflows, potential flood risks, and formulating effective dewatering strategies, which are essential for ongoing mine operations and environmental management. Figure 20 shows the average amount of rainfall per month in Kroondal (Northwest). The numbers are calculated over a 30-year period to provide a reliable average.

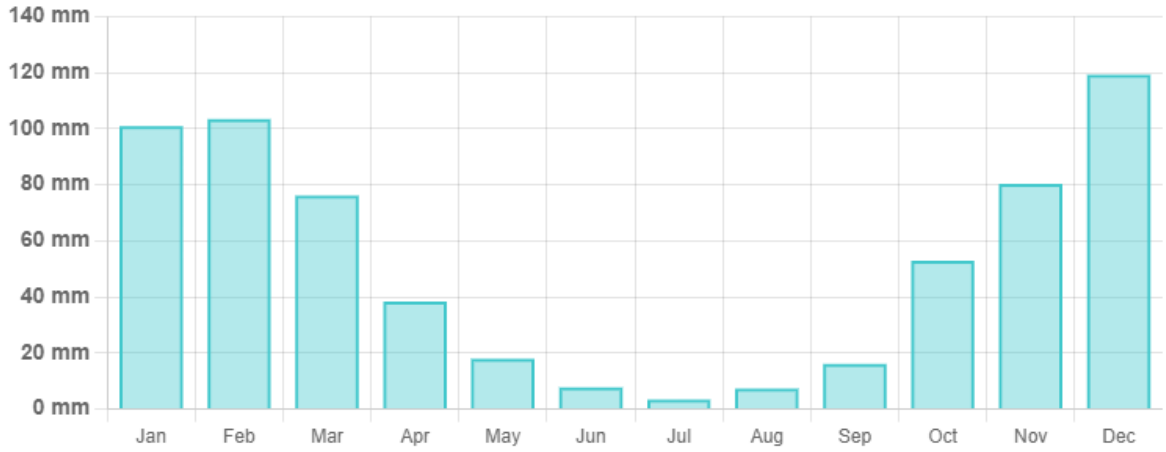


Figure 20: Climatic data representation (Hydrogeek Consulting, 2025)

The Cumulative Rainfall Departure (CRD) is a graph that is constructed by accumulating the monthly differences between a specific monthly rainfall and the average monthly rainfall of the rainfall sequence. Increasing CRD trends are therefore indicative of consecutive above average rainfall events (probably causing groundwater recharge and therefore rising water levels) whilst decreasing CRD trends are indicative of consecutive below average rainfall events with no or very little groundwater recharge and therefore declining water levels.

7.4.4 CLIMATE CHANGE PREDICTIONS

The GreenBook (CSIR, GreenBook 2025) provides downscaled (±8×8 km) climate projections for South Africa to the 2050s and models hydro-meteorological hazards (drought, heat, wildfire, flooding) together with socio-economic exposure and vulnerability at municipal and settlement scales. Table 13 provides a summary of the climate change metrics applicable to the municipality. The Rossby Centre regional model (RCA4) is used in the predictions for climate change. Two trajectories are included based on the four Representative Concentration Pathways (RCPs) discussed in the IPCC's assessment report. RCPs are defined by their influence on atmospheric radiative forcing in the year 2100. RCP4.5 represents an addition to the radiation budget of 4.5 W/m2 as a result of an increase in GHGs. The two RCPs selected were RCP4.5 representing the medium-to-low pathway and RCP8.5 representing the high pathway. RCP4.5 is based on a CO_2 concentration of 560 ppm and RCP8.5 on 950 ppm by 2100. RCP4.5 is based on if current interventions to reduce GHG emissions being sustained (after 2100 the concentration is expected to stabilise or even decrease). RCP8.5 is based on if no interventions to reduce GHG emissions being implemented (after 2100 the concentration is expected to continue to increase).

Table 13: Climate change predictions (CSIR, GreenBook 2025)

Aspect	Baseline (1961-1990)	Predicted Change (2021-2050)	
		RCP4.5	RCP8.5
Average temperature	Min: 12.20°C Avg: 18.62°C Max: 24.99°C	+ 2.24°C — 2.85°C	+ 2.83°C — 3.18°C
# very Hot Days[1]		+ 5.36 days — 38.82 days	+ 9.24 days — 49.94 days
Average annual rainfall	953.31mm	-61.54mm — 84.82mm	14.08mm — 109.90mm
# extreme annual rainfall days[2]		-1.42 days — 0.86 days	-0.54 days — 1.54 days

Climate change hazards identified for the municipality include:

- Predicted fire danger days increase to 46[3].
- The likelihood of wildfires occurring in the wildland-urban interface is regarded as likely in the residential settlement areas.
- Residential settlements have a moderate potential for increased flooding due to the predicted increase in extreme rainfall days.
- There is a predicted increase in drought tendencies per 10 years (more frequent than baseline), with the communities in the area having a moderate increase in drought exposure.
- The surrounding settlements are predicted to have a medium to high risk of encountering increasing heat stresses (heat waves and extreme heat days).

Predicted climate changes should be integrated into design and risk assessment considerations. For this project, the following aspects are addressed:

- Pollution control structures must account for medium to long-term climate changes, including increased instances of extreme rainfall and potential increases in overall precipitation.
- More intense rainfall events and settlement expansion into flood-prone areas increase flood risk for roads, bridges, stormwater systems, and low-lying zones, which is relevant to mine stormwater management, tailings, and pollution control facilities.
- Conservative assumptions and inputs should be applied when determining floodlines to reduce long-term infrastructure flood risk.
- Climate change scenarios need to be incorporated into mine water balance planning.

[1] where temperatures exceed 35°C.
[2] more than 20 mm in 24 hours.
[3] A fire danger day is described as a day when the McArthur fire-danger index exceeds a value of 24.

- Design criteria and stormwater management should allow for higher magnitude design storms and brief peak intensities, with attention to robust attenuation, diversions, erosion protection, and verification of tailings and waste facility freeboard and spillway capacity under heavier rainfall.
- Water security strategies should include drought-resilient approaches, such as increased reuse, modular treatment, contingency sourcing, and integration of groundwater monitoring for planned abstraction or storage activities.
- Heat and workforce safety measures should involve heat-stress management plans, including work-rest cycles, provision of shade, hydration, and early-warning triggers based on local thresholds during periods of high temperatures.
- Fire management protocols for servitudes and perimeter areas should be enhanced through fuel breaks, regular inspections, accessible roads, and coordination with relevant fire agencies.
- In project areas adjacent to high-vulnerability settlements, collaborative design of stormwater, flood mitigation, and heat relief interventions with municipal authorities is recommended to minimize external risk.

7.5 SURFACE WATER AND DRAINAGE

7.5.1 REGIONAL DRAINAGE AND SURFACE TOPOGRAPHY

South Africa is divided into nine (9) Water Management Areas (WMAs). The delegation of water resource management from central government to catchment level is achieved by establishing Catchment Management Agencies (CMAs) at WMA level. Each CMA progressively develops a Catchment Management Strategy (CMS) for the protection, use, development, conservation, management and control of water resources within its WMA. This is to ensure that on a regional scale, water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all persons. The main instrument that guides and governs the activities of a WMA is the CMS which, while conforming to relevant legislation and national strategies, provides detailed arrangements for the protection, use, development, conservation, management and control of the region's water resource

The project area falls within the Crocodile West and Marico Water Management Area (WMA), quaternary catchment A22H (Figure 22). The Crocodile West and Marico WMA encompass of catchments in Gauteng, North West, and Limpopo provinces. It includes the Crocodile (West), Marico, Ngotwane (South African portion), and Upper Molopo rivers and is part of the larger Limpopo River basin. The area's economy is heavily reliant on its water resources, which support major sectors like industry, mining, and agriculture.

The A22H quaternary catchment area is 579 km^2 and has a MAR of 14.07 million m^3. Runoff emanating from this quaternary catchment drains in a north–easterly direction via the Hex River. Elevations in the A22H quaternary range from 1220 meters above mean sea level (mamsl) at the highest point within the catchment and drop to 1112 mamsl at the outlet of the catchment.

Surface drainage at the Rustenburg Chrome Mine site occurs mainly towards the west in the direction of the Hex River. Runoff is taken by two tributaries which flow towards the west into the Hex River, of which one of the tributaries originates at the RCM site. The elevation of this area ranges from 1130 mamsl to 1150 mamsl (Figure 21). Surface drainage at the Rietfontein Chrome Plant area occurs mainly towards the South, directly into the Sandspruit as this site is situated approximately 1 km from the Sandspruit.

The main water course in the A22H quaternary catchment is the Hex River found on the western side of the project area; this river joins the Elands River which is a tributary to Crocodile River.

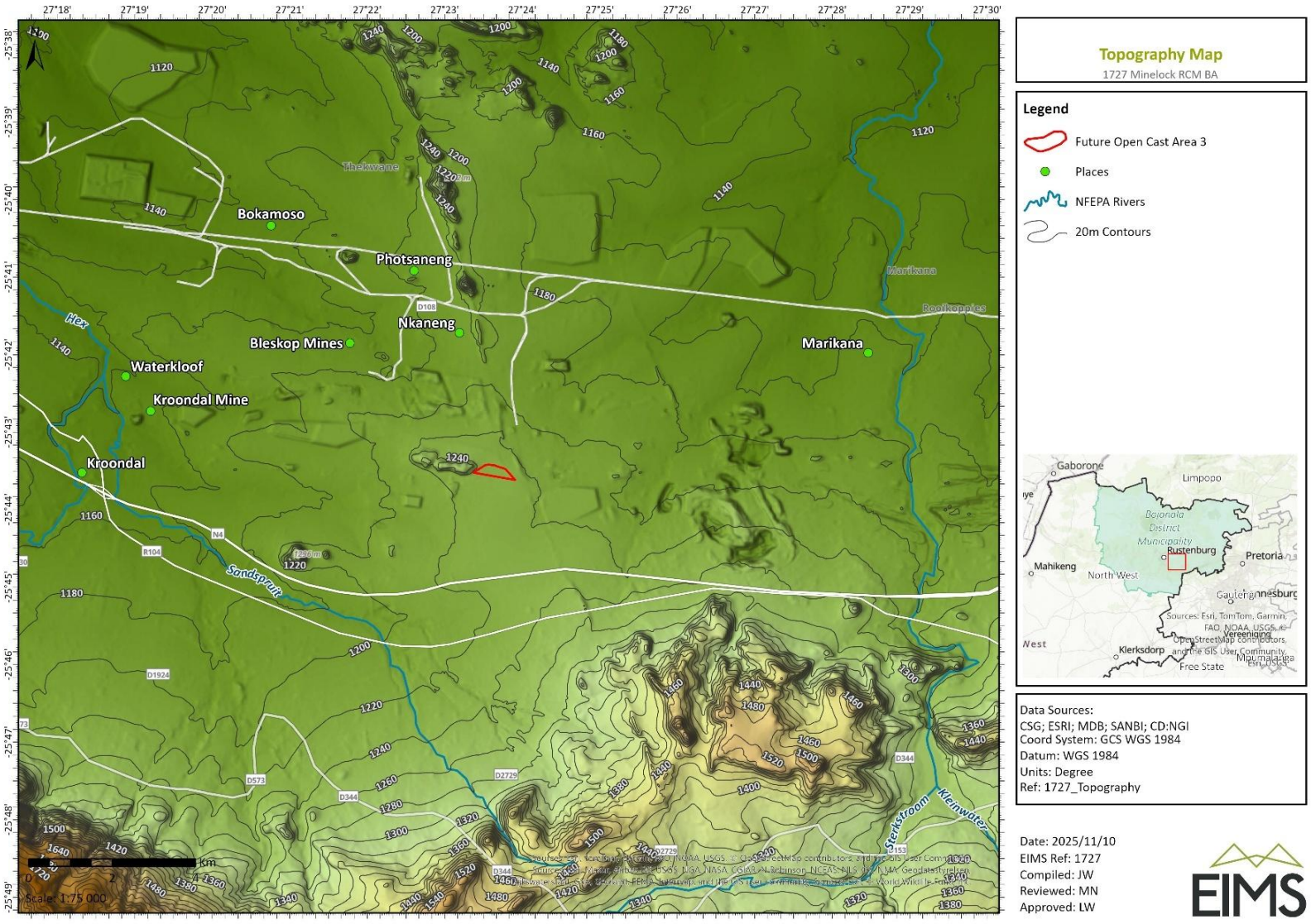


Figure 21: Topography of the study area

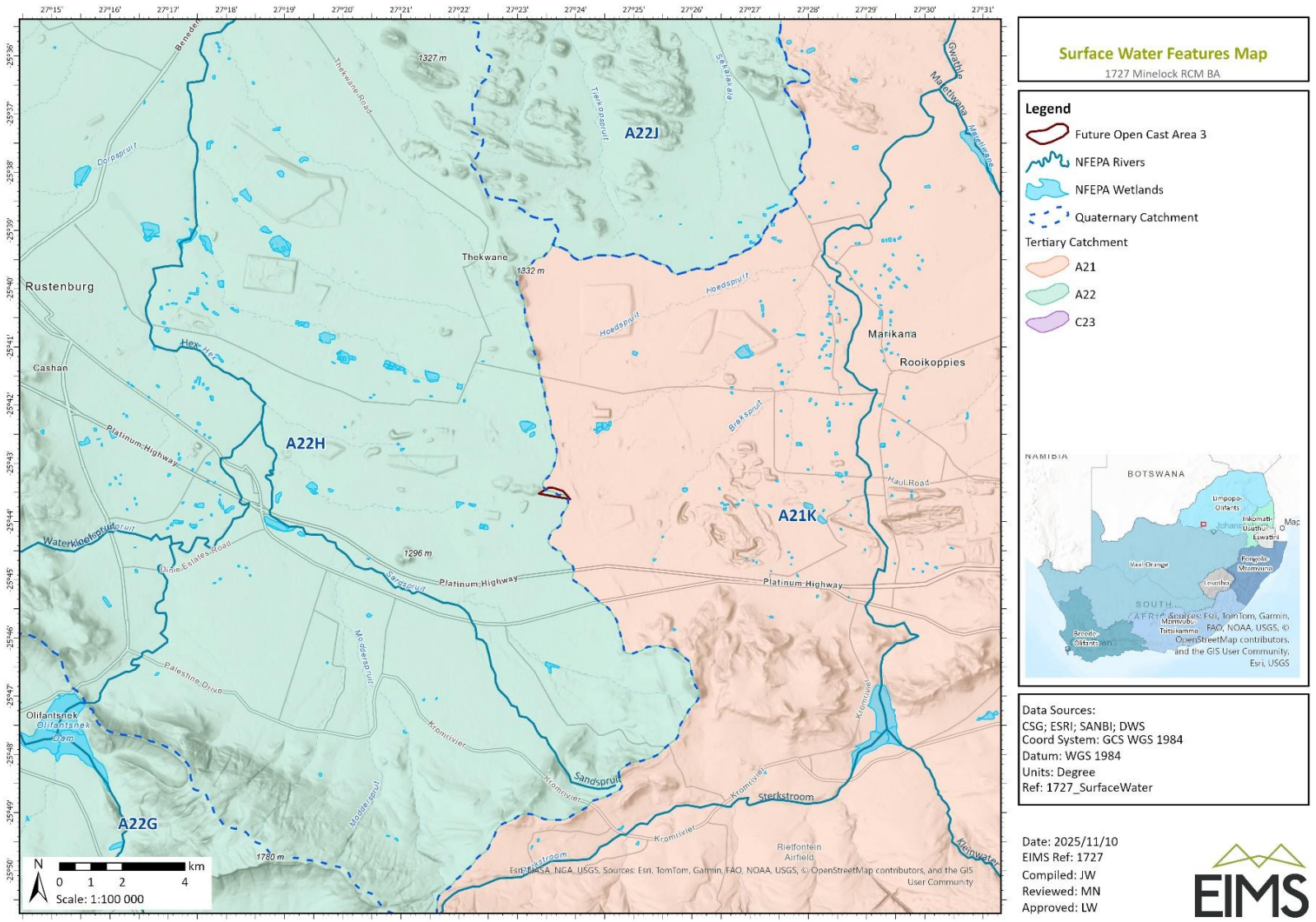


Figure 22: Regional Surface Water Features

7.5.2 SOUTH AFRICAN INVENTORY OF INLAND AQUATIC ECOSYSTEMS (SAIIAE)

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was released with the NBA 2018. Ecosystem threat status (ETS) of river and wetland ecosystem types are based on the extent to which each river ecosystem type had been altered from its natural condition. Ecosystem types are categorised as CR, EN, VU or LT, with CR, EN and VU ecosystem types collectively referred to as 'threatened' (Van Deventer *et al.,* 2019; Skowno *et al.,* 2019). Neither the PAOI nor the 500 m regulated area overlaps with any SAIIAE wetlands or Rivers (Figure 23).

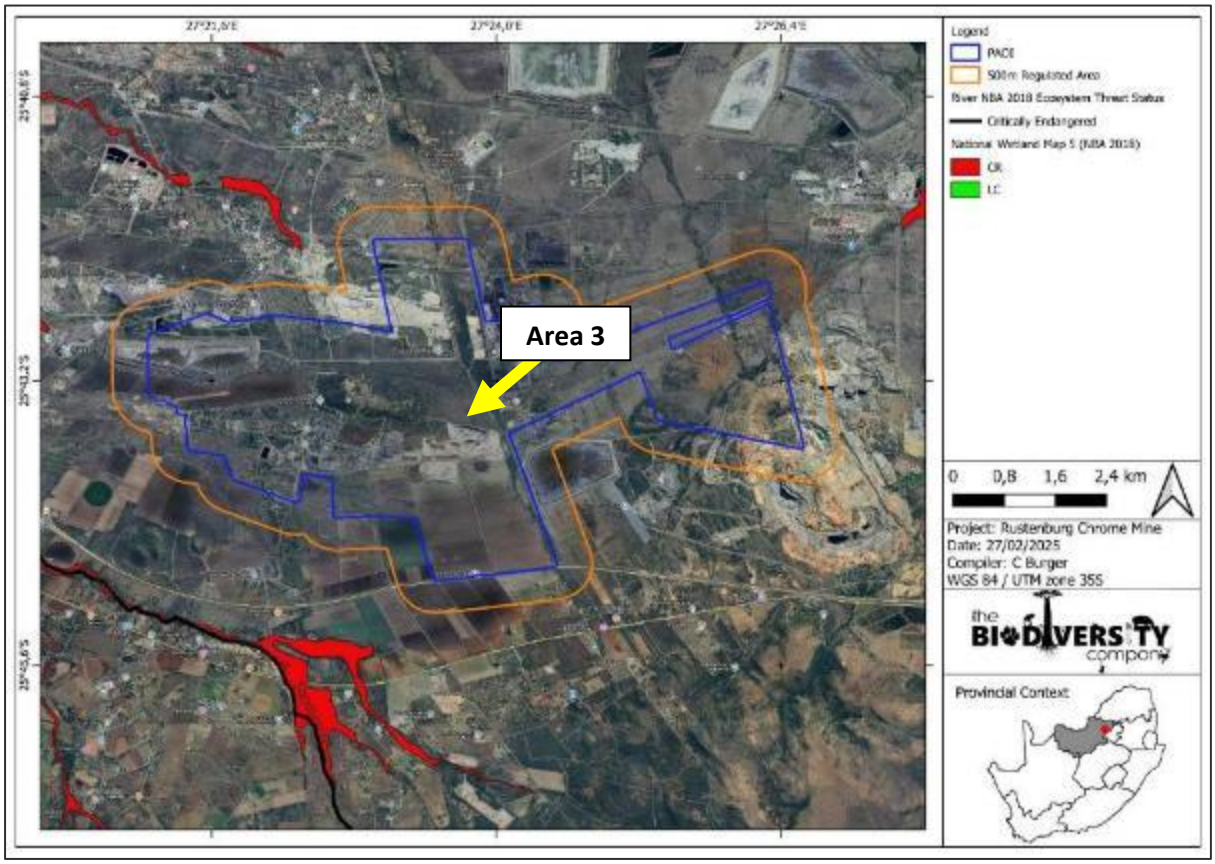


Figure 23: Map illustrating the ecosystem threat status of rivers and wetland ecosystems in the extended study area (The Biodiversity Company, 2025)

7.5.3 NATIONAL FRESHWATER ECOSYSTEM PRIORITY AREAS

In an attempt to better conserve aquatic ecosystems, South Africa has categorised its river systems according to set ecological criteria (i.e., ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs) (Driver *et al.,* 2011). The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's (NEM:BA) biodiversity goals (Nel *et al.,* 2011). Figure 24 shows that the 500 m regulated area and the PAOI overlaps non-priority (unclassified) FEPA wetlands.

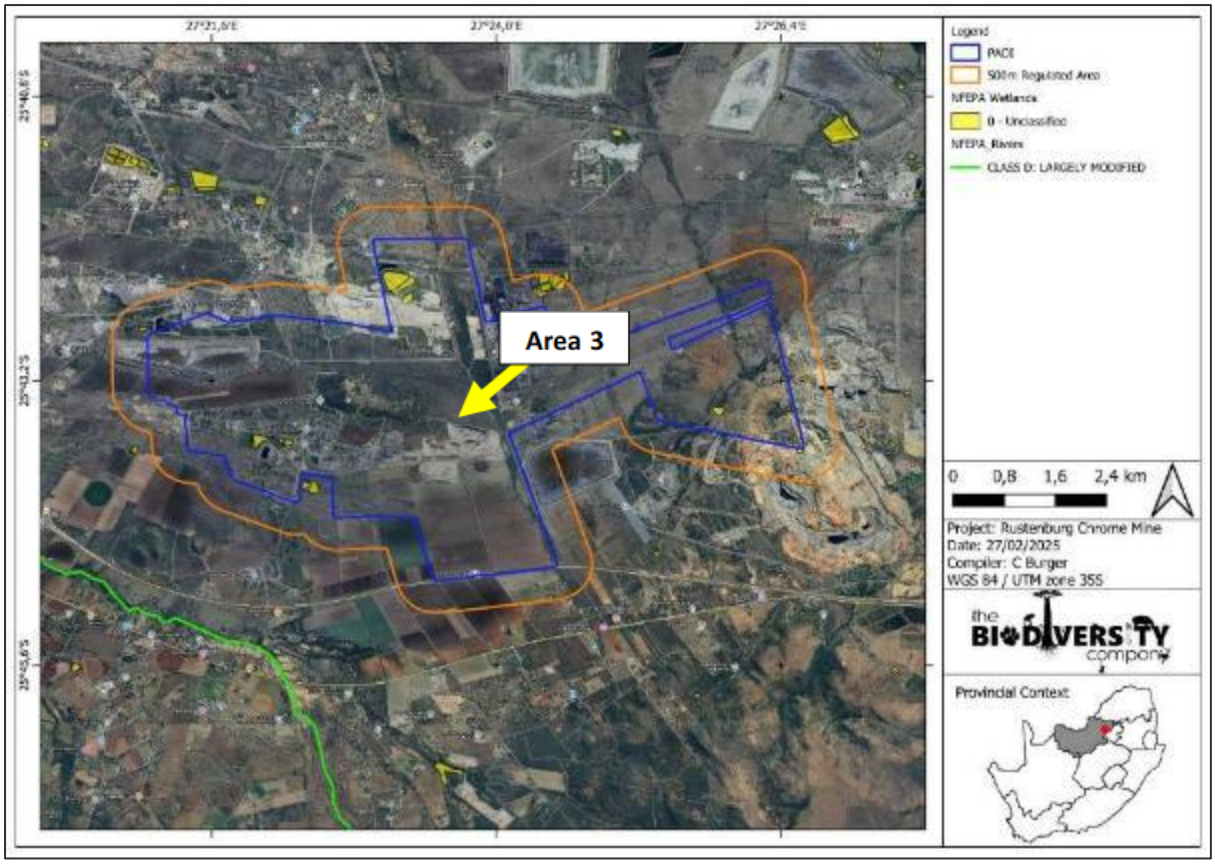


Figure 24: The PAOI in relation to the National Freshwater Ecosystem Priority Areas (The Biodiversity Company, 2025)

7.5.4 NORTH WEST BIODIVERSITY SECTOR PLAN

As per the North West Biodiversity Sector Plan (NWBSP) (North West READ, 2015) the aquatic areas of importance in relation to the proposed project are ESA 1 and ESA 2 categories which overlap with the proposed study area (Figure 25). The ESA 1 and ESA 2 areas refer to areas containing wetland features and water movement areas such as non-perennial river lines. The ESA's are required to maintain landscape connectivity to the CBA's.

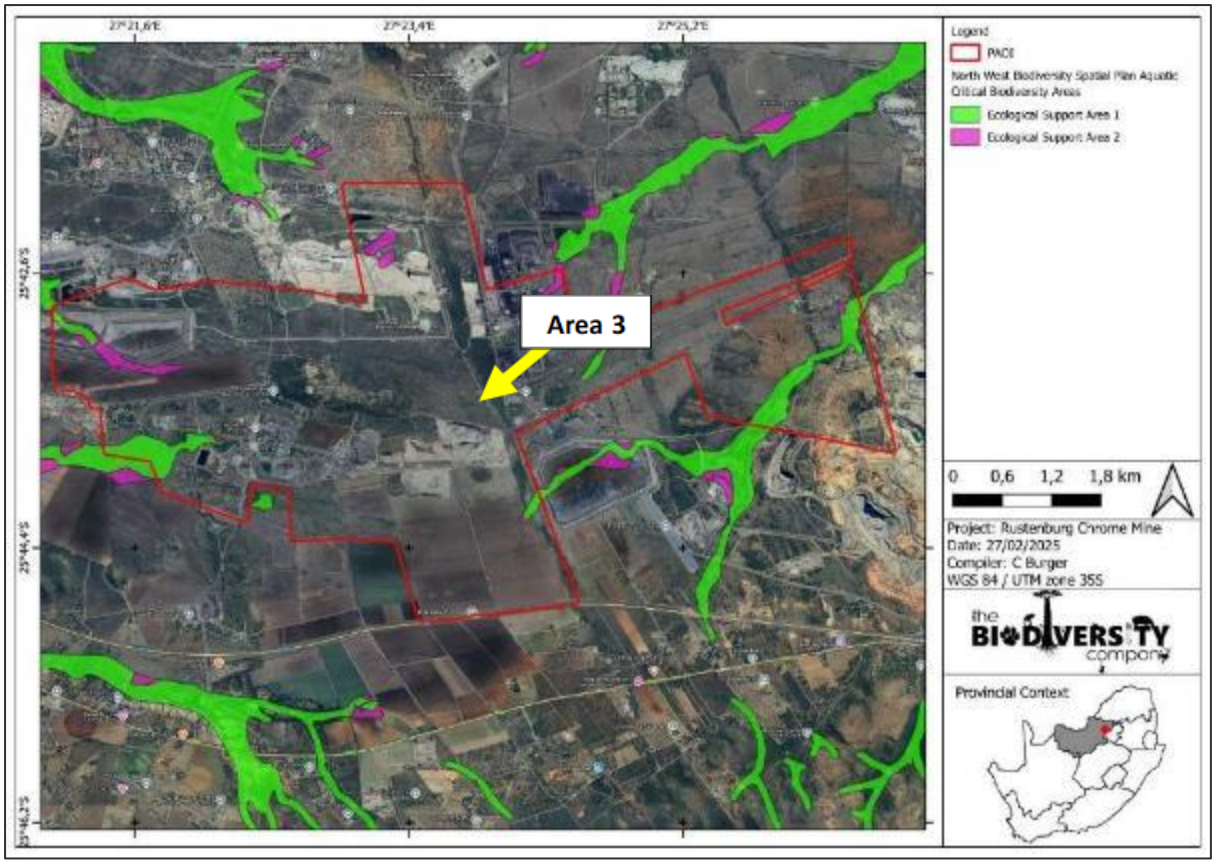


Figure 25: Aquatic CBAs and ESAs present within the Project Area of Influence (The Biodiversity Company, 2025)

7.5.5 STRATEGIC WATER SOURCE AREAS

SWSAs are defined as areas of land that supply a disproportionate quantity of mean annual surface water runoff in relation to their size, and therefore contribute considerably to the overall water supply of the country, as well as national aquatic and terrestrial biodiversity resources. These are considered key ecological infrastructure assets and the effective protection of SWSAs is vital for national security because a lack of water security will compromise national security and human wellbeing on all levels. The PAOI overlaps the Kroondal / Marikana Groundwater SWSA (Figure 26).

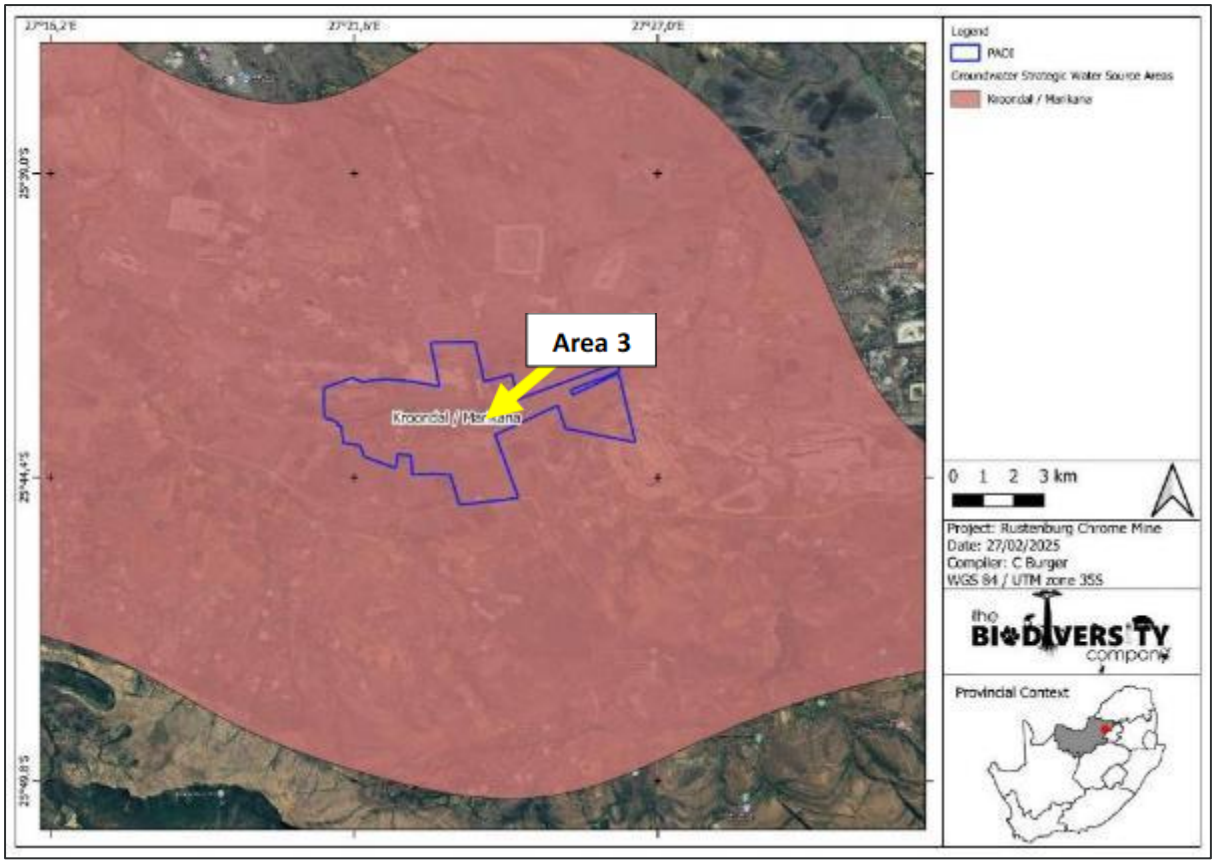


Figure 26: The PAOI in relation to the SWSA dataset (The Biodiversity Company, 2025)

7.6 GROUNDWATER

7.6.1 HYDROGEOLOGY

The hydrogeological setting of the proposed Area 3 pit expansion is characterised by a dual aquifer system consisting of a shallow saprolitic aquifer developed in the weathered zone and a deeper fractured bedrock aquifer associated with the Rustenburg Layered Suite. Area 3 lies within a structurally complex hydrogeological environment, with localized high-permeability features (dolerite) embedded within a generally low-yielding fractured system. Future pit inflows are likely to be moderate but could increase substantially where mining intersects dolerite intrusions. Additional targeted drilling, aquifer testing, and monitoring along the dyke corridor are recommended to refine inflow predictions and guide dewatering system design.

7.6.2 SHALLOW (SAPROLITIC) AQUIFER

Recharge occurs primarily from rainfall infiltration through the unsaturated zone. Vertical percolation is dominant, with limited lateral flow. The weathered zone generally extends to depths of 9–25 m bgl, averaging ~15 m. Hydraulic conductivities vary significantly—from 10^{-8} m/d to 20 m/d, depending on lithology—while porosity ranges from 0.25 to 0.7. This aquifer represents the main reservoir for local recharge and is likely to contribute to early-stage pit inflows during excavation.

7.6.3 FRACTURED BEDROCK AQUIFER

Groundwater movement in the underlying fractured rock is controlled by secondary structural features such as faults, joints, and dykes. Water levels typically occur between 5 m and 40 m bgl, with low borehole yields of 0.1–2 L/s, indicating limited storage capacity. Hydraulic conductivities in this aquifer are typically 10^{-5} m/d, with porosities of about 0.05. Groundwater quality is moderate to poor, often showing elevated Ca–Mg–Cl–SO_4 concentrations and EC values between 4.4 – 120 mS/m.

7.6.4 PREFERENTIAL FLOW AND STRUCTURAL CONTROLS

The hydrogeology is strongly influenced by dolerite and syenite dykes, trending mainly northeast–southwest and north–south. These structures act variably as barriers or conduits depending on fracturing. Field evidence indicates that dolerite-related structures are hydraulically active, showing measurable permeability and localised yields up to 1.5 L/s, while syenite-hosted fractures are poorly connected and mostly dry. Consequently, groundwater inflows to the planned pit are expected to be spatially variable, with higher inflow potential near dolerite zones intersecting the pit footprint. It is not expected that dewatering volumes from Area 3 will be significantly greater than the existing pit, and it would therefore, not affect the water balance of the mine significantly.

7.6.5 WATER STRIKES AND WEATHERING

Historic data indicate water strikes at 10–30 m bgl, corresponding to the base of the weathered zone. Average weathering depths of ~24 m support the conceptual model of a moderately deep, variably saturated profile.

7.6.6 GROUNDWATER LEVELS

The proposed expansion of the existing opencast pit (Area 3) is situated within a hydrogeological setting dominated by a shallow, topography-driven groundwater system. According to the Digby Wells Groundwater Specialist Study (2015), regional groundwater levels are largely controlled by surface elevation and are only marginally influenced by underground mining activities. As such, groundwater levels below approximately 11 mbgl are considered representative of steady-state baseline conditions for model calibration.

Groundwater levels within and around the existing opencast pits remain largely unquantified due to the absence of dedicated monitoring boreholes. It is therefore recommended that targeted drilling and installation of piezometers be undertaken near the active and proposed pit areas to better characterise groundwater flow dynamics and potential pit inflow.

7.6.7 DEPTH TO GROUNDWATER, PIEZOMETRIC HEADS AND FLOW DIRECTIONS

According to the Digby Wells Groundwater Specialist Study (2015), regional shallow groundwater levels are primarily influenced by topography and are less affected by underground mining activities. Consequently, groundwater levels below 11 meters below ground level (mbgl) can be used as a steady baseline for model calibration.

Recent data from the hydrocensus study conducted in February 2025 shows that groundwater levels in the area range from 5.2 to 46.5 mbgl, with an average level of 16.43 mbgl. The deeper groundwater levels (>30 mbgl) measured in boreholes BH19 and LANBH8 are associated with the underground workings, where groundwater is being abstracted. It can be assumed that these deeper groundwater levels are influenced by underground mining. In contrast, shallow groundwater levels (<8 mbgl) in boreholes LANBH13, BH16A, and LANBH6, located near the Tailings Storage Facility (TSF) and dams, are more likely to be affected by seepage from these facilities. These predictions will be validated through quality sampling.

It is important to note that groundwater levels around the current opencast pits remain unknown, as no boreholes have been drilled in these areas. To address this data gap, it is recommended to site and drill monitoring boreholes near the opencast mining areas to obtain a clearer understanding of groundwater behaviour in these zones. This information will be valuable for managing water resources and mitigating potential environmental impacts related to the opencast mining operations.

As expected in natural systems, groundwater levels generally follow the topography of the land surface. A scatterplot of groundwater levels versus surface elevation provides insight into whether any influences, such as mining activities or facilities, are affecting groundwater behaviour. If any groundwater levels have significantly decreased or increased beyond the expected trend, these would appear as outliers on the graph.

The scatterplot (Figure 27) shows a generally consistent relationship between surface elevation and groundwater level elevation, with an average alignment between the two. As surface elevation increases, the groundwater levels tend to increase as well, which is consistent with natural groundwater flow patterns.

However, some outliers are observed above and below the trend line. These outliers correspond to boreholes that are either drilled into deeper underground workings or located near waste facilities, where groundwater may be influenced by mining activities or seepage from infrastructure such as tailings dams.

The presence of these outliers confirms the potential impact of underground mining and nearby waste facilities on groundwater levels, which warrants further investigation to understand the extent of their influence. Identifying and addressing these anomalies will help refine groundwater models and improve water management strategies, particularly in areas near mining operations and waste storage facilities.

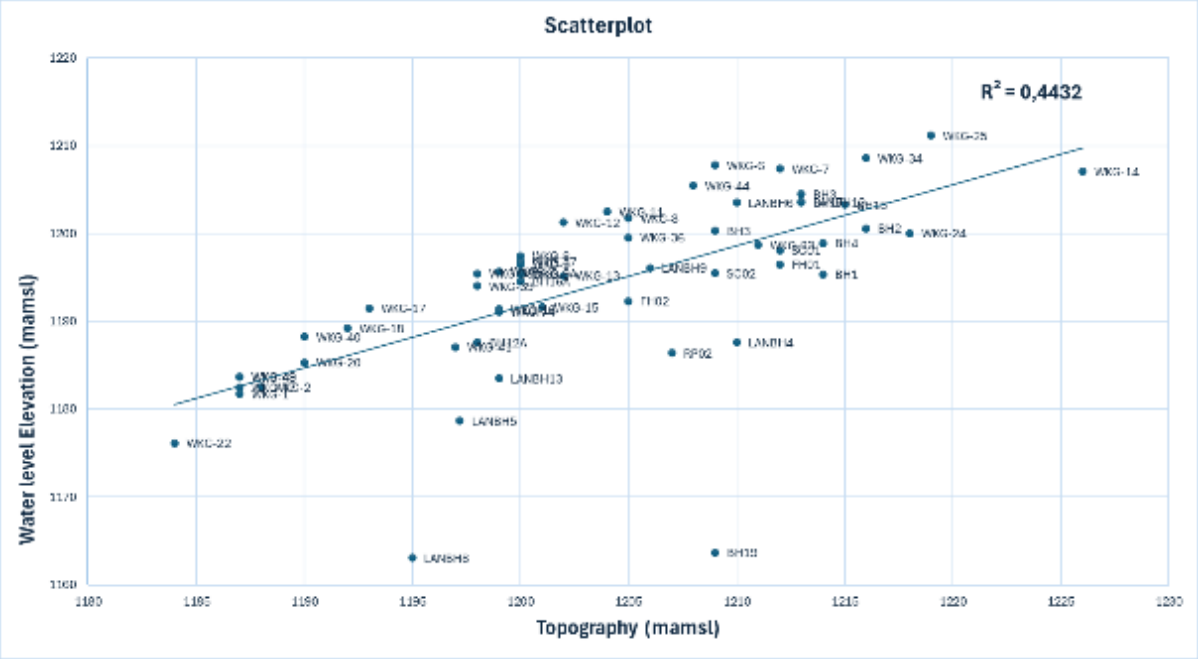


Figure 27: Scatterplot of groundwater boreholes: Surface Elevation vs Water Level Elevation (Hydrogeek Consulting, 2025)

The general flow direction is towards the major drainage Hex River in the west (Figure 28 and Figure 29). Locally the groundwater flow directions are altered through abstraction from boreholes and potential seepages from waste areas. (Figure 28). Most of the data available are located in the eastern part of the mine.

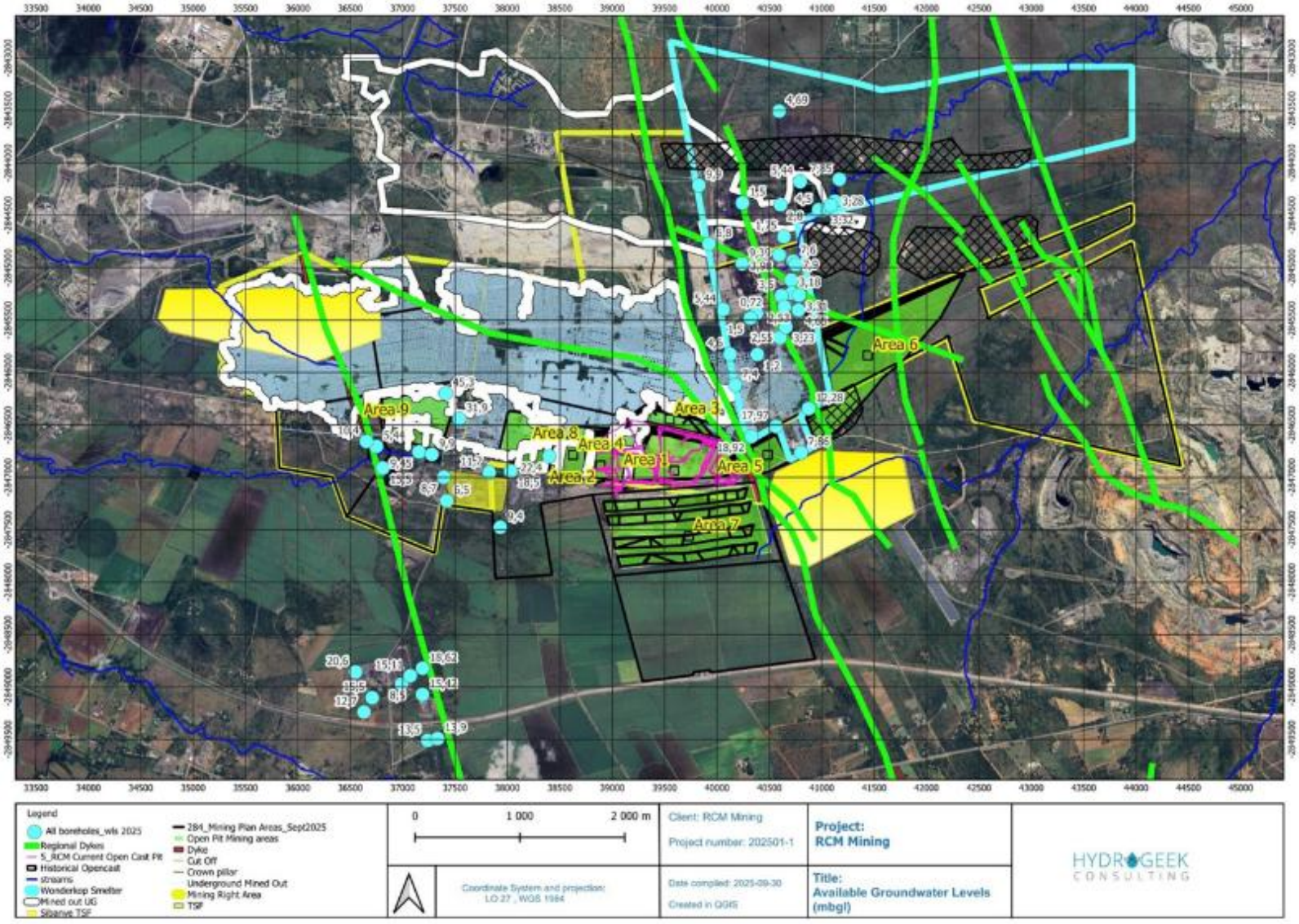


Figure 28: Monitoring Boreholes Locations (Hydrogeek Consulting, 2025)

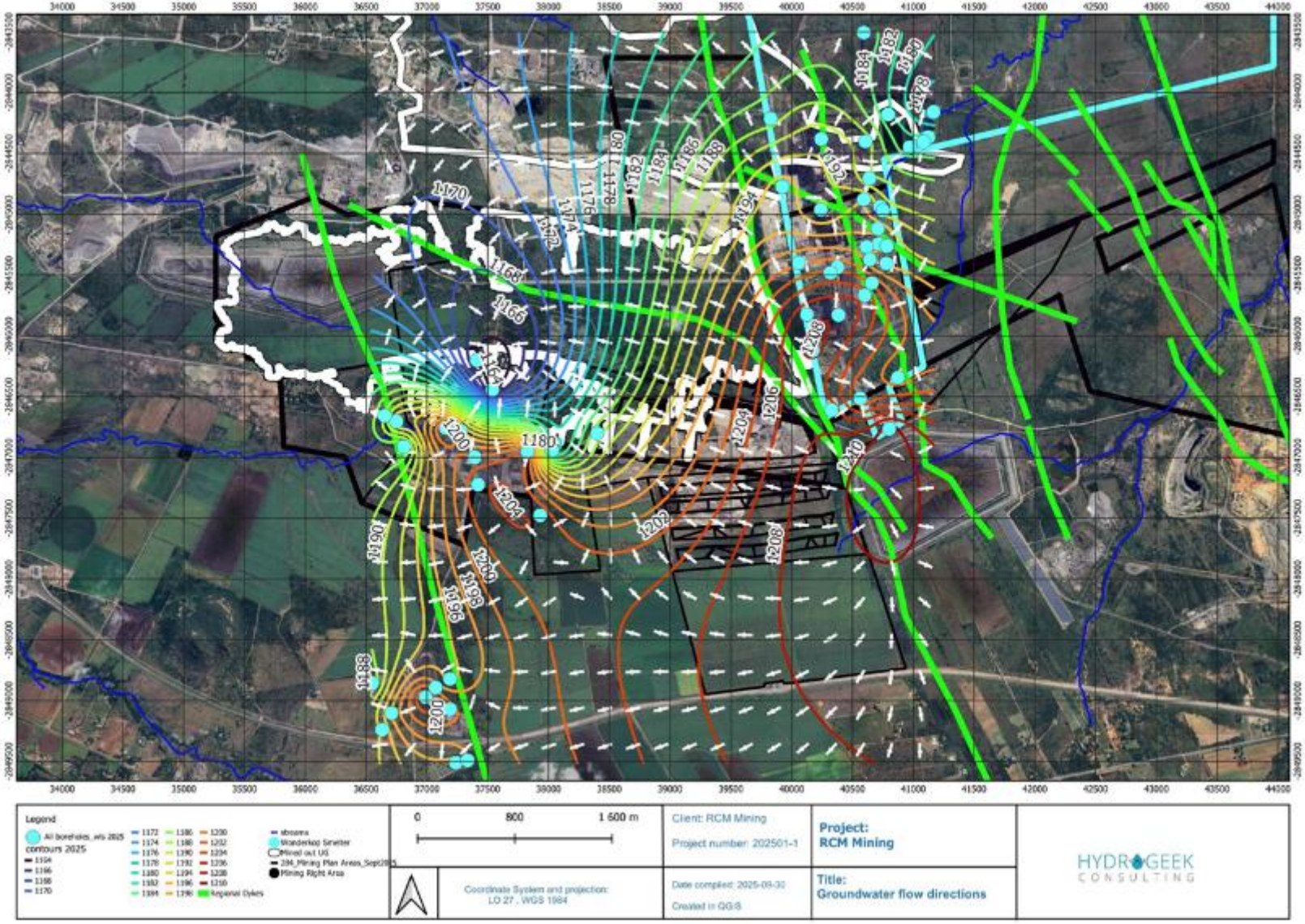


Figure 29: Groundwater flow contours (Hydrogeek Consulting, 2025)

7.6.8 PASSIVE INFLOWS

Dewatering requirements for the Area 3 opencast expansion are expected to remain low to moderate. Groundwater inflows into the existing open pit are currently minimal, with natural accumulation in the pit sump averaging approximately 60 m^3/day. During periods of active pumping in 2025, abstraction volumes ranged between 200 and 500 m^3/day for the current area 1, reflecting relatively limited groundwater ingress under current conditions.

Previous groundwater assessments, however, estimated potential inflows in the order of 1,000–1,700 m^3/day, suggesting that inflow rates may increase as mining progresses into deeper, more fractured, or water-bearing geological zones. For Area 3, which exhibits similar hydrogeological characteristics, low initial inflows are anticipated, but localized increases may occur where dolerite- or fracture-controlled flow paths are intersected. Continuous monitoring of sump accumulation and pumping rates will therefore be essential to validate inflow predictions and optimise dewatering system design during pit advancement.

7.6.9 RECHARGE

Groundwater recharge is the process by which water moves downward from the surface to underground aquifers. It occurs through natural processes like precipitation, infiltration, and percolation, as well as through artificial recharge methods. Pre mining conditions the Hex River would have acted as the regional drain to remove groundwater as baseflow to the river. A small portion of rainfall (approximately 1-3%) would have recharged groundwater. As mining activities started the disturbed areas have been altered. Recharge rates are expected to be higher up to 50% on waste areas and open-cast mining.

7.6.10 WATER QUALITY BASELINE

Quarterly Groundwater samples collected across the Wonder area (April 2025) were assessed against the SANS 241:2015 Drinking Water Standards. The dataset provides a representative baseline for Area 3 and other long term planned adjacent new mining areas.

- pH values are generally within acceptable limits (7.1–8.3), indicating neutral to slightly alkaline conditions.
- Electrical Conductivity (EC) and Total Dissolved Solids (TDS) show significant variability, with EC ranging from ~43 mS/m to >2,000 mS/m and TDS ranging between ~260 mg/l and >4,000 mg/l. This reflects heterogeneous water quality across the aquifer system.
- Major cations (Ca, Mg, Na, K) and anions (Cl^-, SO_4^{2-}, NO_3^-) vary widely, with elevated sulphate (>500 mg/l) and chloride (>300 mg/l) concentrations recorded in several boreholes (e.g., WKG-3, WKG-6, WKG-15, WKG-41, WKG-44, WKG-48). These exceedances point to localized zones of saline or mineralized groundwater, likely linked to geological structures or evaporite influence.
- Nitrate (NO_3^-) concentrations are generally low (<5 mg/l), though elevated values up to 82 mg/l (WKG-44) suggest localized anthropogenic influence or oxidizing conditions enhancing nitrate mobility.
- Trace Elements & Metals:
    - Iron (Fe) and Manganese (Mn) are sporadically elevated. Mn exceeds the guideline (0.4 mg/l) in boreholes such as WKG-3 (0.66 mg/l), WKG-18 (0.86 mg/l), WKG-49 (1.38 mg/l), and WKG-44 (0.94 mg/l).
    - Chromium (Cr) is elevated in isolated boreholes, e.g., WKG-11 (0.42 mg/l) and WKG-44 (3.04 mg/l), exceeding the SANS limit of 0.05 mg/l.
    - Fluoride (F) is generally below 1.5 mg/l, with the exception of WKG-38 (1.26 mg/l) and WKG-48 (1.94 mg/l).

    - Other metals (Al, Cu, Zn, Pb) mostly remain below detection or acceptable limits, though Pb occasionally approaches the threshold (0.01 mg/l).

- Dolerite-associated zones appear to host higher salinity and sulphate, while syenite-hosted zones are more dilute but can exhibit localized exceedances.

Implications for Mining Areas For Area 3 and the other long term planned new mining areas, this baseline indicates:

- A need for ongoing monitoring of sulphate, chloride, and nitrate due to potential exceedances.
- Trace metal risks (Mn, Cr, Fe) that may affect pit inflows and require consideration in dewatering discharge management.
- Water quality heterogeneity strongly linked to structural features, meaning pit intersecting dolerite dykes may encounter more mineralized inflows compared to syenite zones.

7.6.11 AQUIFER CLASSIFICATION

The aquifer(s) underlying the subject area were classified in accordance with: A South African Aquifer System Management Classification, December 1995 (Parsons, 1995). The aquifers are classified according to the following definitions:

- **Sole Aquifer System:** An aquifer which is used to supply 50% or more of domestic water for a given area, and for which there is no reasonably available alternative sources should the aquifer be impacted upon or depleted. Aquifer yields and natural water quality are immaterial.
- **Major Aquifer System:** Highly permeable formations, usually with a known or probable presence of significant fracturing. They may be highly productive and able to support large abstractions for public supply and other purposes. Water quality is generally very good (Electrical Conductivity of less than 150 mS/m).
- **Minor Aquifer System:** These can be fractured or potentially fractured rocks which do not have a high primary permeability, or other formations of variable permeability. Aquifer extent may be limited and water quality variable. Although these aquifers seldom produce large quantities of water, they are important for local supplies and in supplying base flow for rivers.
- **Non-Aquifer System:** These are formations with negligible permeability that are regarded as not containing groundwater in exploitable quantities. Water quality may also be such that it renders the aquifer unusable. However, groundwater flow through such rocks, although imperceptible, does take place, and needs to be considered when assessing the risk associated with persistent pollutants.

Based on geological analysis and hydrocensus data it can be concluded that the aquifer system in the study area can be classified as a **Minor Aquifer System.** Even though these aquifers seldom produce large quantities of water, they are important for local supplies and in supplying base flow for rivers. It should also be remembered that this Area is located within a SWSA, which elevates the sensitivity of the water resource further.

7.7 AIR QUALITY

This chapter provides details of the receiving environment which is described in terms of:

- The identification of Air Quality Sensitive Receptors (AQSRs) from available maps and Google Earth imagery;
- A study of the atmospheric dispersion potential of the area taking into consideration local meteorology, land-use and topography;
- The identification of existing sources of emissions in the study area; and

- The analysis of all available ambient air quality information/data to determine pre-development ambient pollutant levels and dustfall rates.

7.7.1 RECEIVING ENVIRONMENT

AQSRs primarily refer to places where people reside; however, it may also refer to other sensitive environments that may adversely be affected by air pollutants. Ambient air quality guidelines and standards, as discussed under **Section 4.1.12**, have been developed to protect human health. Ambient air quality, in contrast to occupation exposure, pertains to areas outside of an industrial site/mine boundary where the public has access to and according to the NEMAQA, excludes areas regulated under the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) (Dept of Labour, 1993).

AQSRs within this area includes several households, farmsteads, and schools in the immediate vicinity of the mine as shown in Figure 30. The town of Marikana is approximately 6 km to the east with Nkaneng ~2.6 km to the north of the surface mine boundary and Photsaneng ~4 km to the north. There are no immediate receptors to the proposed expansion area.

Figure 30: Potential sensitive receptors within the study area (Airshed Planning Professionals, 2025)

7.7.2 ATMOSPHERIC DISPERSION POTENTIAL

Physical and meteorological mechanisms govern the dispersion, transformation, and eventual removal of pollutants from the atmosphere. The analysis of hourly average meteorological data is necessary to facilitate a comprehensive understanding of the dispersion potential of the site. Parameters useful in describing the dispersion and dilution potential of the site i.e. wind speed, wind direction, temperature and atmospheric stability, are briefly discussed in Section 7.4.

The AERMOD dispersion model requires terrain data to facilitate computation of air flow around hills. Terrain will be included in the dispersion model. Topographical data to be used is SRTM (30m, 1 arc sec) obtained from the USGS. The natural landscape of the study area is characterised by a rolling topography, with an increase in height toward the Magalies Mountains approximately 8 km to the south.

7.7.3 EXISTING SOURCES OF EMISSIONS

Mining and processing activities, farming and residential land-uses occur in the region. These land-uses contribute to baseline pollutant concentrations via vehicle tailpipe emissions, household fuel combustion, biomass burning and various fugitive dust sources. Long-range transport of particulates, emitted from remote tall stacks and from large-scale biomass burning in countries to the north of South Africa, has been found to contribute to background fine particulate concentrations within the South African boundary (Andreae, et al., 1996; Garstang, Tyson, Swap, & Edwards, 1996; Piketh, Annegarn, & Kneen, 1996).

7.7.4 MINING AND INDUSTRIAL OPERATIONS

Fugitive emissions from opencast and underground mining operations mainly comprise of land clearing operations (i.e. scraping, dozing and excavating), materials handling operations (i.e. tipping, off-loading and loading, conveyor transfer points), vehicle entrainment from haul roads, wind erosion from open areas, drilling and blasting. These activities mainly result in particulates and dust emissions, with small amounts of oxides of nitrogen (NOx), carbon monoxide (CO), SO_2, methane and CO_2 being released during blasting operations.

Tharisa Chrome and Platinum mine is located approximately 5 km to the east of RCM's surface boundary with a dormant mine directly to the east. Samancor western chrome mine is roughly 8 km to the east. Further afield are Bleskop Mines, Kroondal Mine, and Rustenburg Platinum Mine. Anglo Platinum Smelter Operation (Waterval Smelter) and Impala Platinum are all located around Rustenburg, about 20 km to the west-northwest. Rhovan Vanadium is to the north of Brits and Vanchem to the east, both with associated mining operations. Most of the smelters have mining operations associated with it, with tailings storage facilities, unpaved roads and other materials handling activities generating dust.

7.7.5 AGRICULTURAL OPERATIONS

Agriculture is a land-use within the area surrounding the site. Particulate matter is the main pollutant of concern from agricultural activities deriving from windblown dust, biomass burning, and dust entrainment as a result of vehicles travelling along dirt roads. The quantity of windblown dust is a function of the wind speed, the extent of exposed areas and the moisture and silt content of such areas.

Amongst the mining and industrial operations between Brits and Rustenburg, there are a number of citrus farms and other agricultural activities. Crop farming and mixed crop farming include land tilling operations, fertiliser and pesticide applications, and harvesting. By applying fertiliser and pesticides use are typically made of vehicles (tractors) driving on unpaved roads and exposed soil. Land tilling includes dust entrainment on exposed surfaces, windblown dust and scraping and grading type activities resulting in fugitive dust releases. Both particulate matter (PM) and gaseous air emissions (mainly NO, NO_2, NH_3, SO_2 and VOCs) are generated from the application of nutrients as fertilizers or manures (EPA, 1999).

7.7.6 UNPAVED ROADS

Vehicle entrained dust emissions from paved and unpaved roads represent a potentially significant source of fugitive dust in the area surrounding RCM. Unpaved roads include industrial, mine, local farming, and community access roads. The extent of particulate emissions from the main roads will depend on the number of vehicles using the roads and the silt loading on the roadways. The extent, nature and duration of road-use activity and the moisture and silt content of soils are required to be known in order to quantify fugitive emissions from this source.

7.7.7 VEHICLE TAILPIPE EMISSIONS

Air pollution from vehicle emissions may be grouped into primary and secondary pollutants. Primary pollutants are those emitted directly into the atmosphere, and secondary, those pollutants formed in the atmosphere as a result of chemical reactions, such as hydrolysis, oxidation, or photochemical reactions. Notable primary pollutants emitted by vehicles include CO_2, CO, hydrocarbons (HCs), SO_2, NOx, DPM and Pb. Secondary pollutants include: NO_2, photochemical oxidants (e.g. ozone), HCs, sulphur acid, sulphates, nitric acid, nitric acid and nitrate aerosols. Hydrocarbons emitted include benzene, 1.2-butadiene, aldehydes and polycyclic aromatic hydrocarbons (PAH). Benzene represents an aromatic HC present in petrol, with 85% to 90% of benzene

emissions emanating from the exhaust and the remainder from evaporative losses. Vehicle tailpipe emissions are localised sources and unlikely to impact far-field. Both small and heavy private and industrial vehicles travelling along the N4 as well as the unpaved roads, are notable sources of vehicle tailpipe emissions.

7.7.8 HOUSEHOLD FUEL BURNING

Domestic households are known to have the potential to be one of the most significant sources that contribute to poor air quality within residential areas. Pollutants arising from the combustion of wood include respirable particulates, CO and SO_2 with trace amounts of PAHs, in particular benzo(a)pyrene and formaldehyde. Particulate emissions from wood burning have been found to contain about 50% elemental carbon and about 50% condensed hydrocarbons.

Informal settlements in the region are likely to use coal and wood as energy sources. Coal burning emits a large amount of gaseous and particulate pollutants including SO_2, total and respirable particulates including heavy metals and inorganic ash, CO, PAHs, NO_2 and various toxins such as benzo(a)pyrene. Pollutants from wood burning include respirable particulates, NO_2, CO, PAHs, particulate benzo(a)pyrene and formaldehyde. Particulate emissions from wood burning have been found to contain about 50% elemental carbon and about 50% condensed hydrocarbons.

7.7.9 CROP BURNING AND WILDFIRES

Crop-residue burning, and general wildfires (veld fires) represent significant sources of combustion-related emissions associated with agricultural areas. Emissions are greater from sugar cane burning than for savannas wildfires due to sugar cane areas being associated with a greater availability of available material to be burned. The quantity of dry, combustible matter per unit area is on average 4.5 tons per hectare for savannas areas.

The quantification of background particulate concentration, which is of particular importance for the current study, is complicated due to the large number of sources in the region. Sources of particulates also include a significant proportion of fugitive emissions from diffuse sources (e.g. vehicle-entrained dust from roadways, wind-blown dust from stockpiles and open areas, dust generated by materials handling) which are more difficult to quantify than are emissions from point sources. Dust fallout typically impacts in close vicinity of the emission source (up to 3 km) whereas PM10 can remain in the atmosphere for days and impact far afield.

7.7.10 LOCAL AIR QUALITY

It is expected that various local and far-a-field sources are expected to contribute to ambient concentrations in the region. Local sources include wind erosion from exposed areas, fugitive dust from agricultural activities and mining activities, vehicles on roadways and veld burning. Long range particulates can result from remote tall stack emissions and from large scale biomass burning in countries to the north of South Africa. These have been found to contribute significantly to background fine particulate concentrations over the interior of South Africa (Andreae, 1996), (Garstang, 1996), (Piketh, et al., 1996)).

Particulates represent the main pollutant of concern in the assessment of mining operations. The particulates in the atmosphere may contribute to visibility reduction, pose a threat to human health, or simply be a nuisance due to their soiling potential. A dustfall network comprising of 10 dustfall units exist at RCM. Dustfall data from 2021 indicated no exceedances of the NDCR limits, according to the EIA and EMPR conducted in 2022 (Digby Wells, 2022). No recent data was provided for inclusion into the study.

Ambient air quality monitoring data from the Rustenburg Local Municipality's Marikana AQMS that is located ~6.9 km to the east-northeast of the RCM surface mine boundary was used. A summary of the PM measurements is provided in Table 14. The data availability at the station is below the required 90% (SANAS 2010) ranging between 71% and 76% for the period (1 January 2021 – 31 December 2023). The 99th percentile PM10 concentrations (311.5, 209.6 and 233.3 µg/m³) were higher than the NAAQS limit value (75 µg/m³) in 2021, 2022 and 2023 respectively. There were 158, 139 and 151 daily exceedances to the NAAQS for PM10 in 2021, 2022 and 2023 respectively. Similarly, the 99th percentile PM2.5 concentrations (70.6, 60.4 and 74.3 µg/m³) were higher than the NAAQS limit value (40 µg/m³) in 2021, 2022 and 2023 respectively. There were 59, 28 and 50

daily exceedances to the NAAQS for PM2.5 in 2021, 2022 and 2023 respectively. The annual average PM10 and PM2.5 concentrations also exceeded their respective NAAQS (40 and 20 µg/m³) in 2021, 2022 and 2023.

Table 14: Summary of the PM measurements at the Marikana AQMS (Jan 2021 – Dec 2023).

Period	Data Availability (%)	Daily	Annual Average	No of recorded daily exceedances
		99th Percentile		
PM_{10} (µg/m³)				
Criteria		*75 µg/m³*	*40 µg/m³*	*4 days per year*
2021	76%	311.5	103.0	158
2022	71%	209.6	77.7	139
2023	72%	223.3	78.7	151
$PM_{2.5}$ (µg/m³)				
Criteria		*40 µg/m³*	*20 µg/m³*	*4 days per year*
2021	76%	70.6	25.0	59
2022	71%	60.4	21.1	28
2023	72%	74.3	24.1	60

The NAAQS set requirements for air quality that are defined in terms of an indicator, an averaging time for the measurement, a concentration, and a form. PM_{10} and $PM_{2.5}$ are a percentile standard based on 3-years of data. From the data measured at the Marikana AQMS, is evident that the air quality in the region with respect to particulates (PM_{10} and $PM_{2.5}$) is not compliant to the set regulations. The daily 99th percentile concentration of both PM fractions is not to be exceeded for more than 4 days in a year. It must be noted that the station is 6.9 km to the east-northeast of the RCM and the contributions to these elevated concentrations cannot be pinpointed to specific sources. Figure 31 and Figure 32 illustrate the average daily PM_{10} and $PM_{2.5}$ concentrations over the three-year measurement period in comparison to the NAAQS.

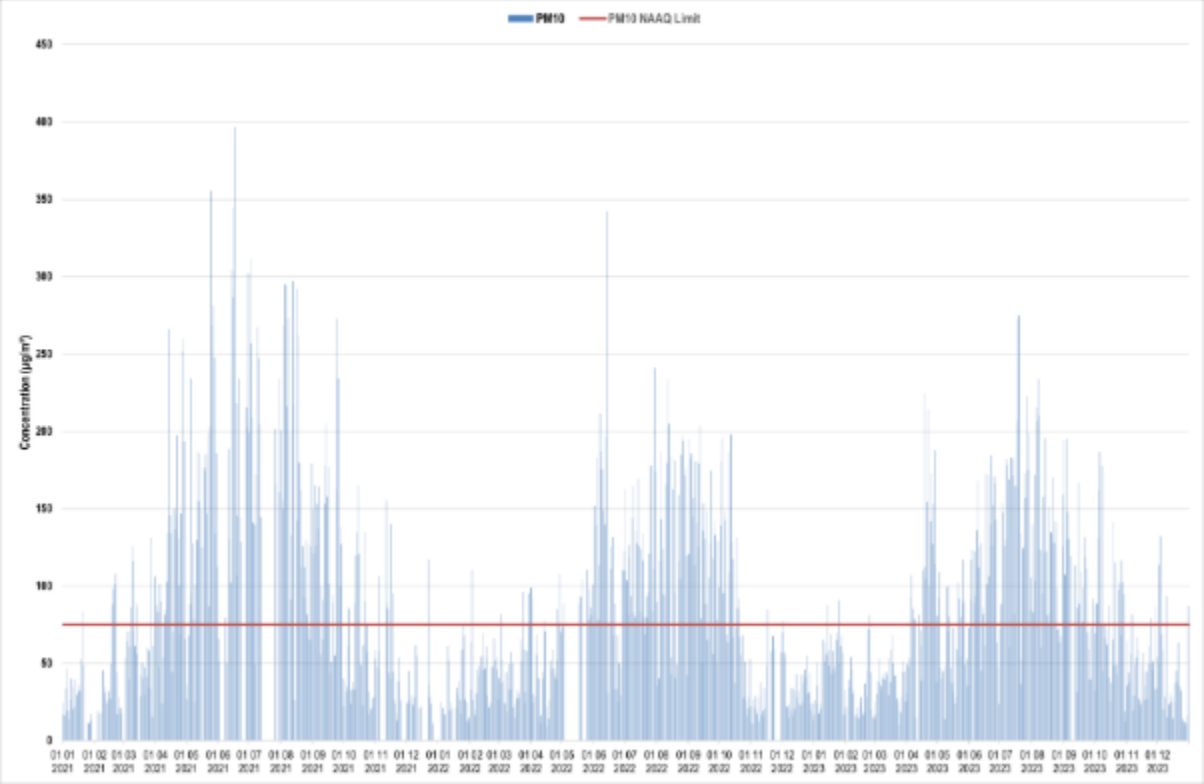


Figure 31: PM10 timeseries plot for measured ambient data from Marikana AQMS (Jan 2021 – Dec 2023)

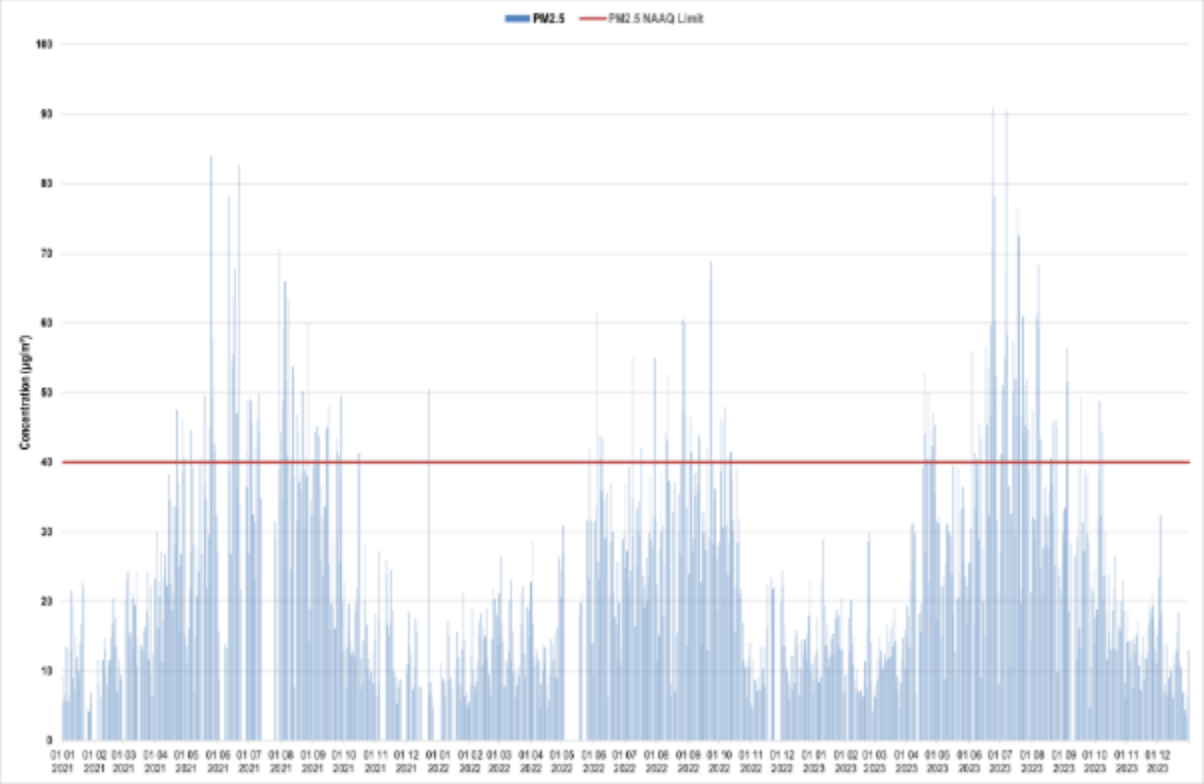


Figure 32: PM2.5 timeseries plot for measured ambient data from Marikana AQMS (Jan 2021 – Dec 2023)

Polar plots provide an indication of the directional contribution as well as the dependence of concentrations on wind speed. An interpretation of the potential sources that contribute to the elevated emissions can be made

using pollutions roses and timeseries plots generated using the R software (Carslaw and Ropkins, 2012; Carslaw, 2013). Whereas the directional display is obvious, i.e., when higher concentrations are shown to occur in a certain sector, e.g., northwest, centrally and northeast for both PM_{10} and $PM_{2.5}$, it is understood that most of the high concentrations occur when winds blow from the northwest sector. When the high concentration pattern is more symmetrical around the centre of the plot, it is an indication that the contributions are near-equally distributed. Although not centrally located, there is an indication that there are sources close by.

It is expected that high ground level concentrations from elevated sources would be more prevalent during stronger wind speeds during stable conditions than daytime, convective conditions, when the plume buoyancy is often not as effective in lifting the plume centreline. Low-level emissions behave differently, and higher concentrations would normally be observed during moderate to weak-wind conditions. It should be noted, however, that some low-level emissions from mines are wind speed dependant (such as materials handling and wind erosion) and will result in significantly higher impacts from these sources during high wind speed conditions.

Elevated PM_{10} and $PM_{2.5}$ concentrations at Marikana AQMS show contributions from the southwest at low to moderate (3 – 5 m/s) wind speeds. The likely sources contributing to these elevated concentrations are residential activities to the southwest and wind erosion from nearby mine dumps towards the south, southeast and east of the AQMS. At very high wind speeds (>10 m/s) the plots show a PM contribution of elevated concentrations from the northwest and northeastern sectors, most likely a result of residential activities such as household and biomass burning coupled with mining activities from the northwest and northeast (Figure 33).

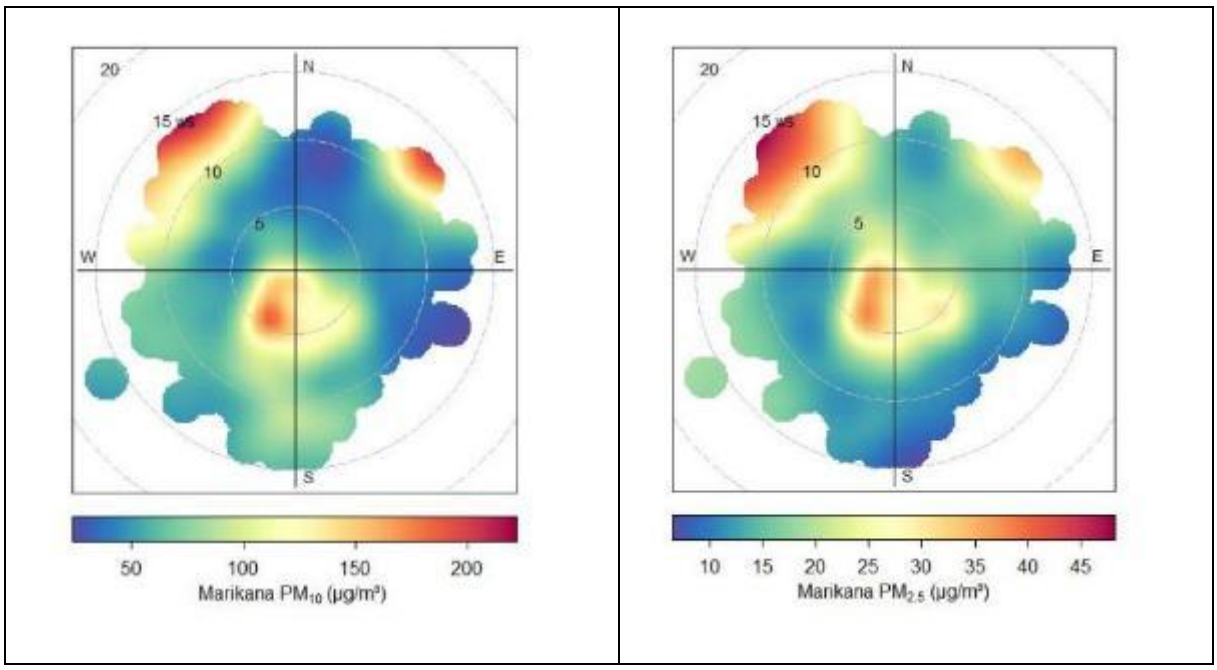


Figure 33: Polar plot of hourly median PM10 and PM2.5 concentrations observations at Marikana AQMS (Jan 2021 – Dec 2023)

7.7.11 POLLUTANTS OF CONCERN

The main pollutants resulting from the current and future operations at RCM are particulate matter (PM) and gaseous emissions such as sulphur dioxide (SO_2), oxides of nitrogen (NOx) and carbon monoxide (CO). PM is the main pollutant of concern from the mining operations with smaller amounts of gaseous emissions mainly released from vehicle and other mining equipment.

The impact of particles on human health is largely dependent on: (i) particle characteristics, particularly particle size and shape, and chemical composition; and (ii) the duration, frequency and magnitude of exposure. The potential of particles to be inhaled and deposited in the lung is a function of the particle size, shape and density. Airborne particulate matter may range from relatively uniform soil particles (e.g. during dust storms) to very complex mixtures of extremely small organic and inorganic particles and liquid droplets (e.g. industrial sites).

These particles could be made up of a number of components, including salts and acids (such as sulfates and nitrates), organic chemicals, metals, and soil or dust particles. The nasal openings permit large dust particles (less than few mm's) to enter the nasal region, along with much finer airborne particulates. Larger particles are deposited in the nasal region by impaction on the hairs of the nose or at the bends of the nasal passages.

Smaller particles, typically less than 10 µm, pass through the nasal region and are deposited in the tracheobronchial and pulmonary regions. Particles are removed by impacting with the wall of the bronchi when they are unable to follow the gaseous streamline flow through subsequent bifurcations of the bronchial tree. As the airflow decreases near the terminal bronchi, the smallest particles (less than 2.5 µm) are removed by Brownian motion, which pushes them to the alveolar membrane (CEPA/FPAC Working Group, 1998; Dockery & Pope, 1994).

Ambient air pollution PM can therefore be divided into three classes based on their size:

- *Inhalable coarse particulate matter* (PM_{10}) consists of particles with a diameter between 2.5 and 10 micrometres (µm) that deposit efficiently along the airways. Particles larger than 10 µm are generally not inhaled into the lungs. These particles are typically found near roadways and dusty industries.
- *Fine particulate matter* ($PM_{2.5}$) consists of particles with a diameter less than 2.5 µm and can be inhaled deeply into the lungs. These particles can be directly emitted from sources such as vegetation fires, or they can form when gases emitted from power plants, industries and automobiles react in the air.
- *Ultrafine particles* ($PM_{0.1}$) consist of particles with a diameter smaller than 0.1 µm and have widespread deposition within the respiratory tract. These particles are typically as a result of secondary chemical reactions in the atmosphere.

Air quality standards and guidelines for airborne particulates are given for various particle size fractions, including total suspended particulates (TSP), and thoracic (PM_{10}) and respirable ($PM_{2.5}$) particulates. Metals associated with chromium mining include chromite and to a lesser extent iron, aluminium, titanium, nickel, cobalt and platinum.

7.8 NOISE

7.8.1 POTENTIAL SENSITIVE RECEPTORS

Potential sensitive receptors within the study area (indicated in Figure 34), include individual households and residential areas (i.e. Nkaneng, Photsaneng, and Waterkloof).

7.8.2 ATMOSPHERIC ABSORPTION AND METEOROLOGY

The main meteorological parameters affecting the propagation of noise include wind speed, wind direction and temperature. These along with other parameters such as relative humidity, air pressure, solar radiation and cloud cover affect the stability of the atmosphere and the ability of the atmosphere to absorb sound energy.

Wind speed increases with altitude. This results in the 'bending' of the path of sound to 'focus' it on the downwind side and creating a 'shadow' on the upwind side of the source. Depending on the wind speed, the downwind level may increase by a few dB but the upwind level can drop by more than 20 dB (Brüel & Kjær Sound & Vibration Measurement A/S, 2000). It should be noted that at wind speeds of more than 5 m/s, ambient noise levels are mostly dominated by wind generated noise.

Meteorological data from WRF1 data, for the period 2022 to 2024, was used for the baseline assessment. During the day the predominant wind direction is from the northern sector with the predominant wind direction during the night from the east-southeast. On average, noise impacts are expected to be more notable to the south during the day and to the west-northwest during the night.

Temperature gradients in the atmosphere create effects that are uniform in all directions from a source. On a sunny day with no wind, temperature decreases with altitude and creates a 'shadowing' effect for sounds. On a clear night, temperatures may increase with altitude thereby 'focusing' sound on the ground surface. Noise impacts are therefore generally more notable during the night.

Figure 34: Potential sensitive receptors within the study area and location of the noise survey sites (Airshed Planning Professionals, 2025)

7.8.3 TERRAIN, GROUND ABSORPTION AND REFLECTION

Noise reduction caused by a barrier (i.e., natural terrain, installed acoustic barrier, building) feature depends on two factors namely the path difference of a sound wave as it travels over the barrier compared with direct transmission to the receiver and the frequency content of the noise (Brüel & Kjær Sound & Vibration Measurement A/S, 2000).

Sound reflected by the ground interferes with the directly propagated sound. The effect of the ground is different for acoustically hard (e.g., concrete or water), soft (e.g., grass, trees or vegetation) and mixed surfaces. Ground attenuation is often calculated in frequency bands to take into account the frequency content of the noise source and the type of ground between the source and the receiver (Brüel & Kjær Sound & Vibration Measurement A/S, 2000). Based on observations made during the visit to site, ground cover was found to be acoustically mixed.

7.8.4 BASELINE NOISE SURVEY

Survey sites were selected after careful consideration of future activities, accessibility, potential noise sensitive receptors, and safety restrictions. A total of 6 survey sites were selected for the survey conducted in April 2025. The locations of the survey sites are provided in Figure 34. The first noise survey campaign was undertaken on the 7th to the 9th of April 2025. The survey results are visually presented in Figure 35 (day-time results) and Figure 36 (night-time results).

The acoustic climate in the area is mainly influenced by insects, vehicle traffic and mining activities. Day-time noise survey results indicate that the acoustic climate in the study area is within the draft Environmental Noise Standards for urban areas. The night-time noise survey levels measured in the study area exceed the draft Environmental Noise Standards for urban areas at Site 1, Site 2, and Site 5.

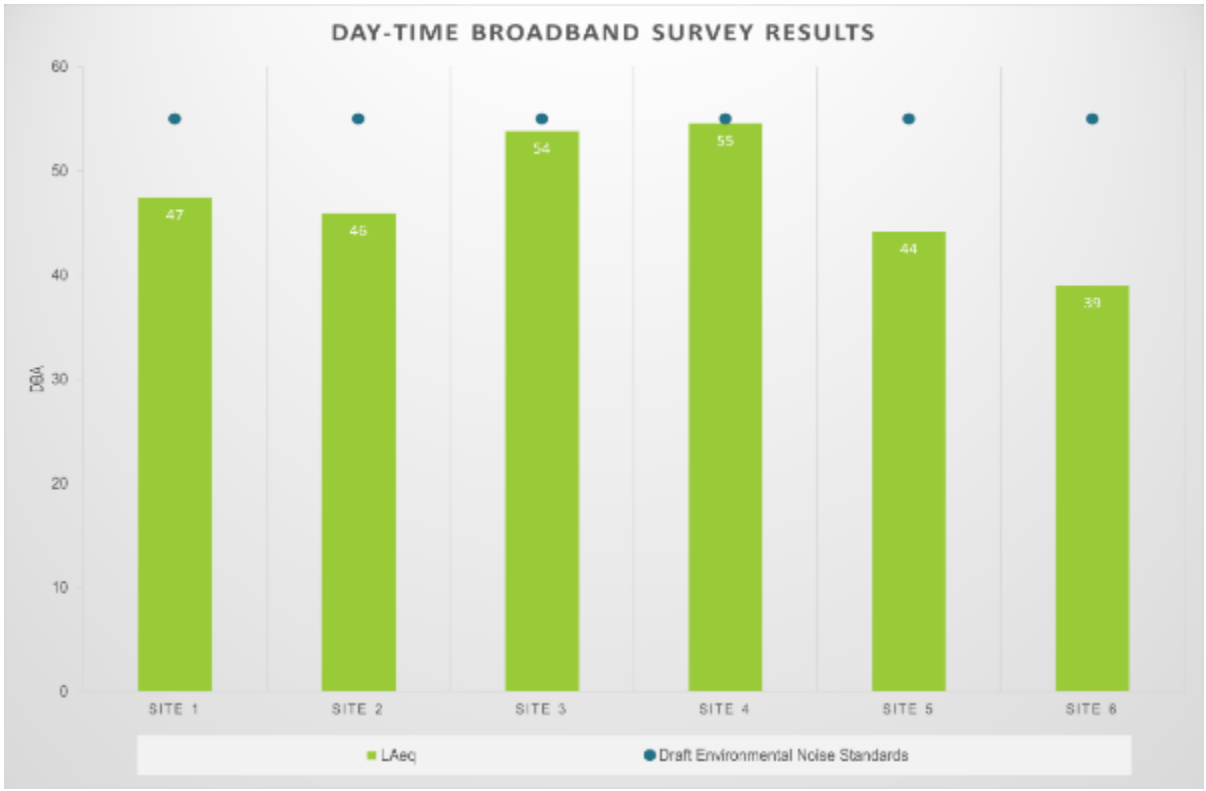


Figure 35: Day-time broadband survey results.

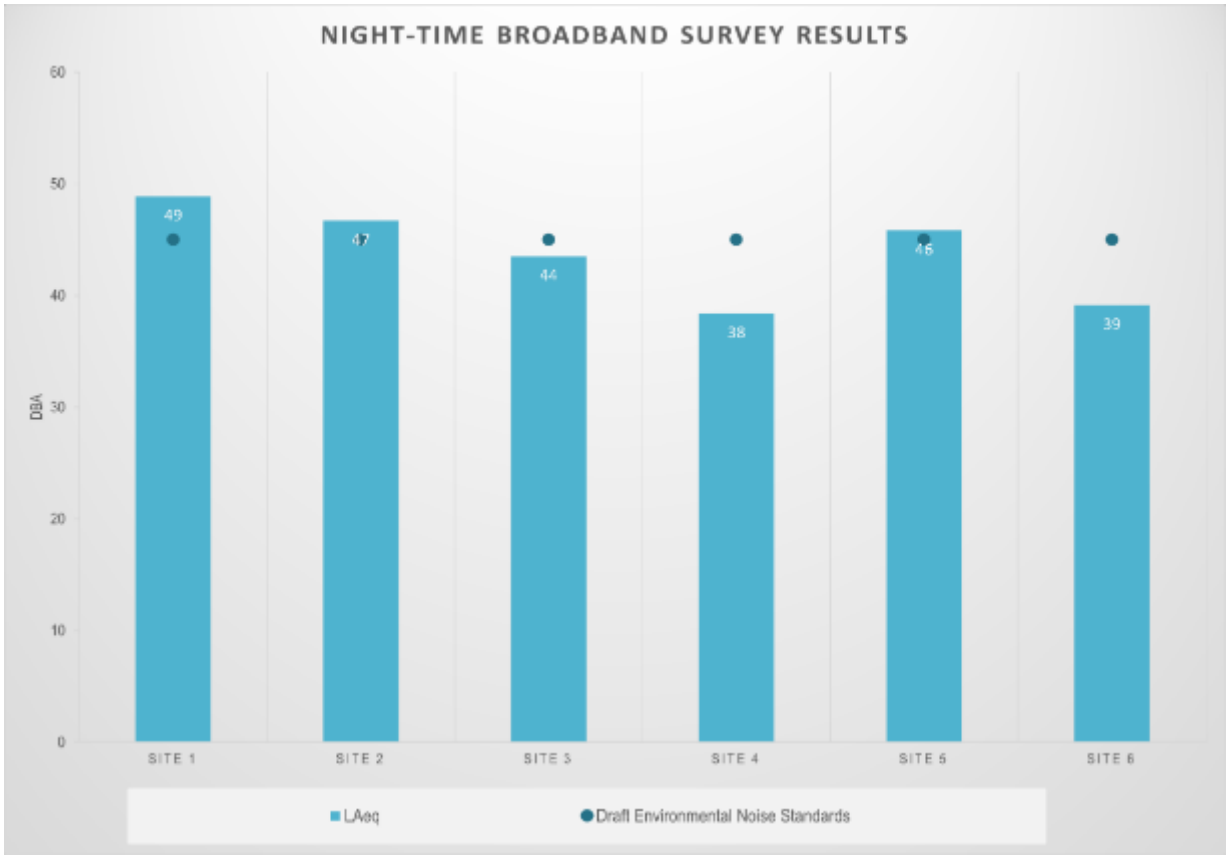


Figure 36: Night-time broadband survey results.

7.8.5 SENSITIVITY AREAS

The sensitivity zones for the study area for construction, operation and closure phases may be classified as follows:

- Industrial areas:
    - Medium sensitivity: 100 m from project activity;
    - Low sensitivity: 200 m from project activity.
- Residential areas:
    - High sensitivity: 500 m from project activity;
    - Medium sensitivity: 1000 m from project activity; and,
    - Low sensitivity: 2000 m from project activity.

7.9 TERRESTRIAL BIODIVERSITY

7.9.1 ECOLOGICALLY IMPORTANT LANDSCAPE FEATURES

Table 15 below has been produced as a result of the spatial data collected and analysed as provided by relevant sources. It presents a summative breakdown of the ecological boundaries considered and the associated relevance that each has to the region or extended study area.

Table 15: Summary of relevance of the proposed project to ecologically important landscape features (The Biodiversity Company, 2025)

Desktop Information Considered	Reasoninga	Reference
Screening Tool	Relevant - The screening tool indicated no flora SCC are expected to occur within the PAOI, however, three (3) animals SCC [*viz*. two (2) mammals and one (1) avifauna] may occur.	**Appendix E**
Ecosystem Threat Status	Relevant - Overlaps with Endangered (EN) ecosystems (RLE, 2022).	**7.9.2**
Ecosystem Protection Level	Relevant - Overlaps with Poorly Protected (PP) ecosystems (NBA, 2018).	**7.9.3**
Provincial Conservation Plan	Relevant - Overlaps with Critical Biodiversity Area (CBA) 2 and Ecological Support Area (ESA) 2 (READ, 2015).	**7.9.4**
South African Protected and Conservation Areas Databases (SAPAD & SACAD)	Relevant - Located within a SACAD Area *viz.* Magaliesberg Biosphere Reserve Transition Zone (SAPAD & SACAD, 2025).	**7.9.5**
National Protected Areas Expansion Strategy (NPAES)	Relevant - Overlaps with NPAES Priority Focus Areas (NPAES, 2018).	**7.9.6**
Key Biodiversity Areas (KBA)	Relevant - Located within *ca*. 2.2 km of the Magaliesberg KBA (2024).	**7.9.7**

Desktop Information Considered	Reasoninga	Reference
South African Inventory of Inland Aquatic Ecosystems (SAIIAE)	Irrelevant - There are no NBA wetlands that occur within the 500 m regulated area of the PAOI (NBA, 2018).	**7.5.2**
National Freshwater Priority Area (NFEPA)	T Relevant - here are no non-priority FEPA wetlands within the 500 m regulated area of the PAOI (NFEPA, 2011).	**7.5.3**
Strategic Water Source Area (SWSA)	Relevant - Overlaps with the Kroondal/Marikana Groundwater Strategic Water Source Area (SWSA, 2018).	**7.5.5**
Mining and Biodiversity Guidelines	Relevant - The PAOI is of medium and high Biodiversity Importance (BI), therefore, there is a correlating medium and high risk for mining (Mining & Biodiversity Guidelines, 2013).	**4.2.1**

7.9.2 ECOSYSTEM THREAT STATUS

The Ecosystem Threat Status is an indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition. According to the spatial dataset the proposed project overlaps with an EN and LC Ecosystem. Refer to Figure 41 for the representation of the ecologically important landscape features.

7.9.3 ECOSYSTEM PROTECTION LEVEL

The Ecosystem Protection Level Status is an indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems. The proposed project overlaps with a PP ecosystem. Refer to Figure 41 for the representation of the ecologically important landscape features.

7.9.4 CRITICAL BIODIVERSITY AREAS AND ECOLOGICAL SUPPORT AREAS

The conservation of CBAs is crucial, in that if these areas are not maintained in a natural or near-natural state, biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity compatible land uses and resource uses (SANBI-BGIS, 2017). The purpose of the North-West Biodiversity Sector Plan (NWBSP) (2015) is to inform land-use planning and development on a provincial scale and to aid in natural resource management. One of the outputs is a map of Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). These are classified into different categories, namely CBA1 areas, CBA2 areas, ESA1 areas and ESA2 areas based on biodiversity characteristics, spatial configuration, and requirements for meeting targets for both biodiversity patterns and ecological processes. Figure 41 shows the PAOI superimposed on the Terrestrial CBA maps. The PAOI overlaps with CBA 2, ESA 2. Refer to Figure 41 for the representation of the ecologically important landscape features.

7.9.5 PROTECTED AREAS

According to the protected area spatial datasets from SAPAD (2024) and SACAD (2024), the PAOI is located within the Magaliesberg Biosphere Reserve 'Transition' zones, and approximately 8 km north of the Magaliesburg Protected Natural Environment. Refer to Figure 41 for the representation of the ecologically important landscape features.

7.9.6 NATIONAL PROTECTED AREA EXPANSION STRATEGY

National Protected Area Expansion Strategy 2016 (NPAES) areas were identified through a systematic biodiversity planning process. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with a strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for fine scale planning which may identify a range of different priority sites based on local requirements, constraints and opportunities (NPAES, 2016). The PAOI overlaps with NPAES Priority Focus Areas. Refer to Figure 41 for the representation of the ecologically important landscape features.

7.9.7 KEY BIODIVERSITY AREAS

A new set of Key Biodiversity Areas (KBA) specific to South Africa has been identified using the Global Standard for the Identification of Key Biodiversity Areas version 1.2 (IUCN 2016), applied to South African species and ecosystems. KBAs are critical sites that play a vital role in maintaining global biodiversity by serving as essential habitats for species. The identification of KBAs enables governments and civil society to pinpoint key locations crucial for species and their habitats worldwide. This understanding facilitates collaborative efforts to manage and conserve these areas, thereby safeguarding global biological diversity and supporting international biodiversity objectives.

Unlike the Important Bird Areas (IBAs), which primarily focus on birds, the KBA framework encompasses a broader spectrum of biodiversity, including mammals, amphibians, plants, and other taxa. BirdLife South Africa (BLSA), in consultation with the KBA National Coordination Group, has opted to retire IBAs and integrate KBAs into its conservation strategy. This strategic shift acknowledges the necessity of investing resources effectively to protect avian and other macroecological elements at the site level within a comprehensive framework of biodiversity conservation (KBA NCG, 2024). The PAOI is situated 2 km from the Magaliesberg KBA. Refer to Figure 41 for the representation of the ecologically important landscape features.

7.9.8 FLORA ASSESSMENT

7.9.8.1 **VEGETATION**

The PAOI is situated in the Savanna biome. The savanna vegetation of South Africa represents the southernmost extension of the most widespread biome in Africa (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the Savanna biome include a seasonal precipitation and a sub-tropical thermal regime with no or usually low incidence of frost (Mucina & Rutherford, 2006). The savanna biome is the largest biome in South Africa, extending throughout the east and north-eastern areas of the country. Savannas are characterised by a dominant grass layer, over-topped by a discontinuous, but distinct woody plant layer (Mucina & Rutherford, 2006). At a structural level, Africa's savannas can be broadly categorised as either fine-leaved (*microphyllous*) savannas or broad-leaved savannas. Fine-leaved savannas typically occur on nutrient rich soils and are dominated by *microphyllous* woody plants of the Mimosaceae family (Common genera include *Vachellia* and *Albizia*) and a generally dense herbaceous layer (Scholes & Walker, 1993).

On a fine-scale vegetation type, the PAOI overlaps with the Marikana Thornveld, vegetation type. Marikana Thornveld extends on the broad plains from Rustenburg in the West, through Marikana and Brits, and towards Pretoria in the East (Mucina & Rutherford, 2006). It is characterised by open *Vachellia karroo* woodland, which occurs in valleys and on undulating plains and hills (Mucina & Rutherford, 2006). Fire-protected habitats, such as drainage lines, rocky outcrops and termitaria are typically dominated by denser, shrub-dominated vegetation (Mucina & Rutherford, 2006).

Based on Mucina and Rutherford's (2006) vegetation classification, important plant taxa are those species that have a high abundance, a frequent occurrence (not being particularly abundant) or are prominent in the landscape within a particular vegetation type. They note the following species are important taxa in the Marikana Thornveld vegetation type:

- **Tall Tree**: Senegalia burkei.
- **Small Trees**: Senegalia caffra, Vachellia gerrardii, Vachellia karroo, Combretum molle, Searsia lancea, Ziziphus mucronata, Vachellia nilotica, Vachellia tortilis subsp. heteracantha, Celtis africana, Dombeya rotundifolia, Pappea capensis, Peltophorum africanum, Terminalia sericea.
- **Tall Shrubs**: Euclea crispa subsp. crispa, Olea europaea subsp. africana, Searsia pyroides var. pyroides, Diospyros lycioides subsp. guerkei, Ehretia rigida subsp. rigida, Euclea undulata, Grewia flava, Pavetta gardeniifolia.
- **Low Shrubs**: Asparagus cooperi, Rhynchosia nitens, Indigofera zeyheri, Justicia flava.
- **Woody Climbers**: Clematis brachiata, Helinus integrifolius.
- **Herbaceous Climbers:** Pentarrhinum insipidum, Cyphostemma cirrhosum.
- **Graminoids**: Elionurus muticus, Eragrostis lehmanniana, Setaria sphacelata, Themeda triandra, Aristida scabrivalvis subsp. scabrivalvis, Fingerhuthia africana, Heteropogon contortus, Hyperthelia dissoluta, Melinis nerviglumis, Pogonarthria squarrosa.
- **Herbs**: Hermannia depressa, Ipomoea obscura, Barleria macrostegia, Dianthus mooiensis subsp. mooiensis, Ipomoea oblongata, Vernonia oligocephala.
- **Geophytic Herbs**: Ledebouria revoluta, Ornithogalum tenuifolium, Sansevieria aethiopica.

According to Mucina and Rutherford (2006), this vegetation type is classified as Endangered, with its national conservation target being 19%. Over 48% has already been transformed by urban expansion and cultivation, and alien invasive plants occur in high densities, especially along drainage lines (Mucina & Rutherford, 2006). Erosion is very low to moderate (Mucina & Rutherford, 2006). Less than 1% is conserved in the Magaliesberg Nature Area, De Onderstepoort Nature Reserve and other reserves. Erosion is very low to moderate (Mucina & Rutherford, 2006. Refer to Figure 41 for the representation of the ecologically important landscape features.

7.9.8.2 HABITATS AND SPECIES OF CONSERVATION CONCERN

Two (2) main habitat types were identified across the PAOI and include:

- Degraded Thornveld; and
- Modified

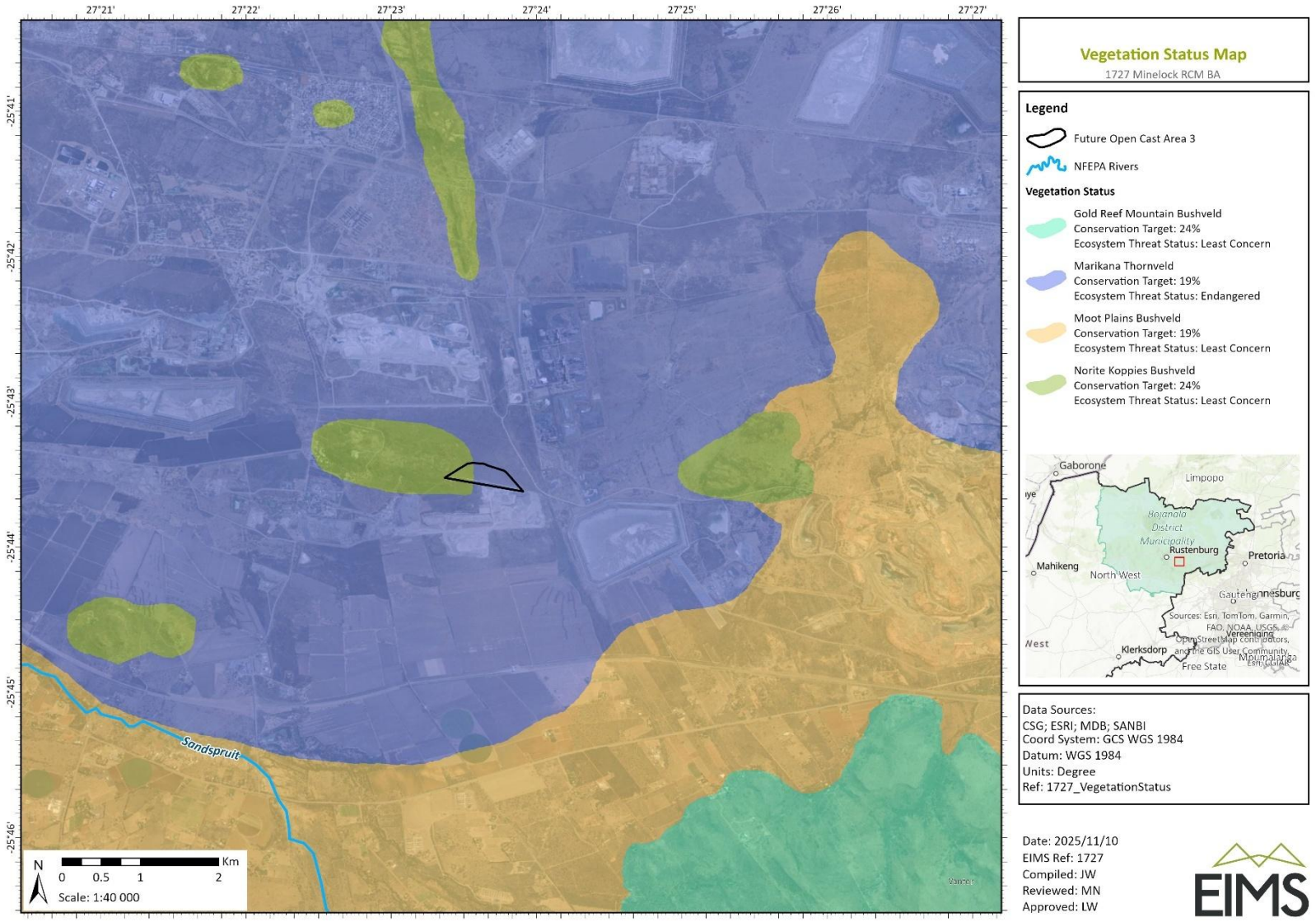


Figure 37: Vegetation Status Map

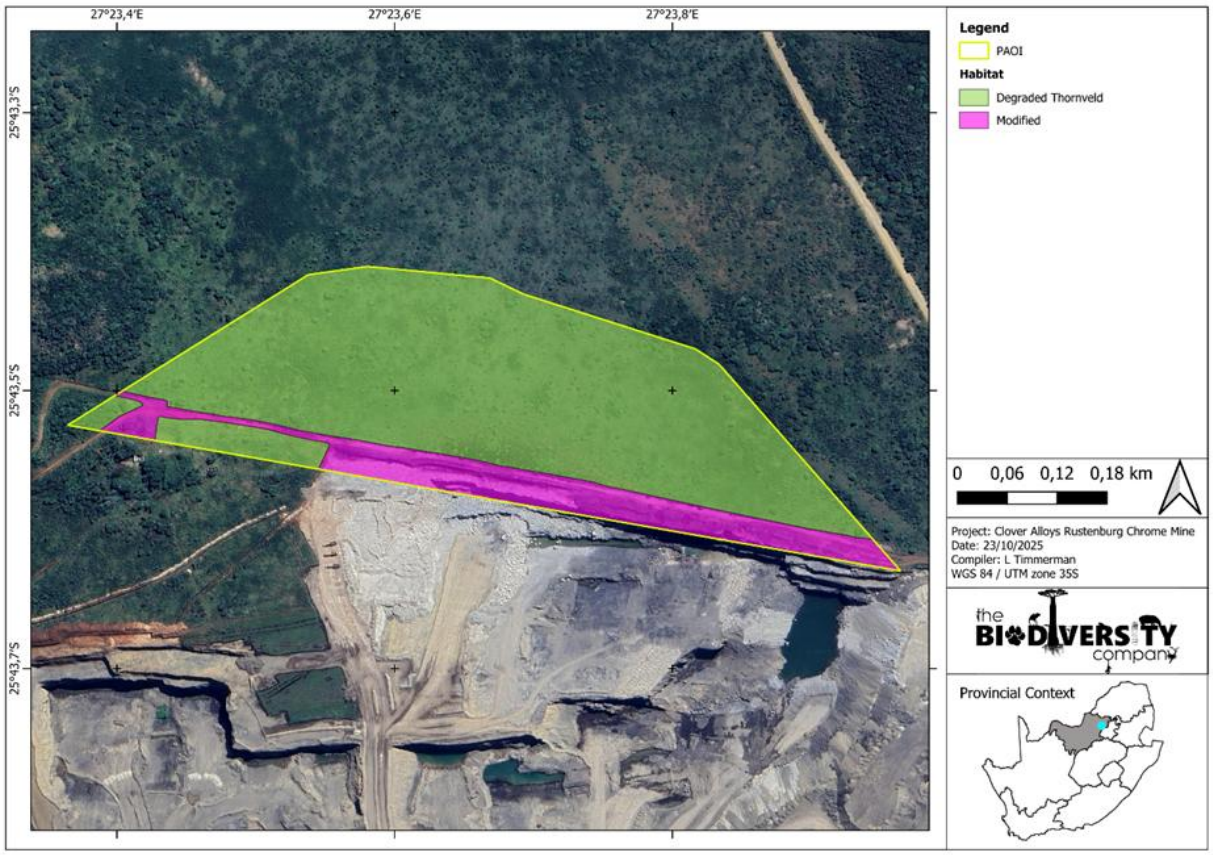


Figure 38: Habitats identified within the PAOI (The Biodiversity Company, 2025

Table 16: Table providing descriptions of the habitat units delineated for the PAOI (The Biodiversity Company, 2025).

Habitat	Description and Condition	Site Ecological Importance
Degraded Thornveld	This habitat unit is characterised by thornveld habitat that has experienced severe levels of degradation owing to the ongoing mining activities in the area, as well as nearby agricultural practices. This habitat unit exists in small, fragmented patches that experience frequent human ingress, and the associated impacts, such as littering and illegal dumping. Bush encroachment *by Dichrostachys cinerea* and *Vachellia tortilis* in some areas is so dense that it is impenetrable. This habitat unit also experiences invasions and infestations by alien and invasive plant species, such as *Tagetes minuta, Bidens pilosa, Solanum seaforthianum, Xanthium strumarium, Datura ferox, Argemone ochroleuca, Datura stramonium, Campuloclinium macrocephalum, Tecoma stans, Flaveria bidentis, Lantana camara, Ipomoea purpurea* and *Melia azedarach*.  Figure 39: Degraded Thornveld (The Biodiversity Company, 2025) This habitat unit has lost much of its functionality and can be considered a poor representation of the Marikana Thornveld which it once was. Without active rehabilitation, it will continue to degrade further until it eventually loses all functionality, as it has done in some of the fragments within the mine boundary. Dominant species within this habitat unit, apart from those listed above, include; *Themeda triandra, Aristida congesta, Paspalum urvillei, Aristida diffusa, Hyparrhenia hirta, Setaria sphacelata, Cymbopogon caesius, Heteropogon contortus, Hilliardiella elaeagnoides, Aloe davyana* and *Vachellia robusta*. No flora or fauna SCC were recorded and none are expected for this habitat unit.	Low

Habitat	Description and Condition	Site Ecological Importance
Modified	This habitat unit includes all areas that maintain little to no native vegetation and/or where anthropogenic activity has substantially modified an area's primary ecological functions and species composition. Within the PAOI, these areas are mostly comprised of active mining areas, the associated infrastructure, existing roads and agricultural fields. These areas include very few, if any, indigenous species and are associated with alien and invasive plant species. No fauna or flora SCC were observed, and none are expected for the habitat unit.  Figure 40: Modified habitat (The Biodiversity Company, 2025)	Very Low

The habitats on site are severely degraded or modified and provide little to no suitable habitat for flora SCCs. The ongoing mining practices result in dustfall, in addition to all other pollution. All habitats are associated with invasions and/or infestations by alien and invasive plant species, contributing to the degraded state of the habitats on site. No flora SCC were recorded or are expected to occur within the proposed expansion area. Refer to Figure 42 for the overall terrestrial biodiversity sensitivity of the site.

7.9.9 FAUNA

The habitats on site are severely degraded or modified and provide little to no suitable habitat for indigenous fauna species, let alone SCCs. High levels of human presence provide a constant deterrent, along with the ongoing mining practices which result in noise pollution, in addition to all other pollution. No fauna SCC were recorded or are expected to occur within the proposed expansion area. Refer to Figure 42 for the overall terrestrial biodiversity sensitivity of the site.

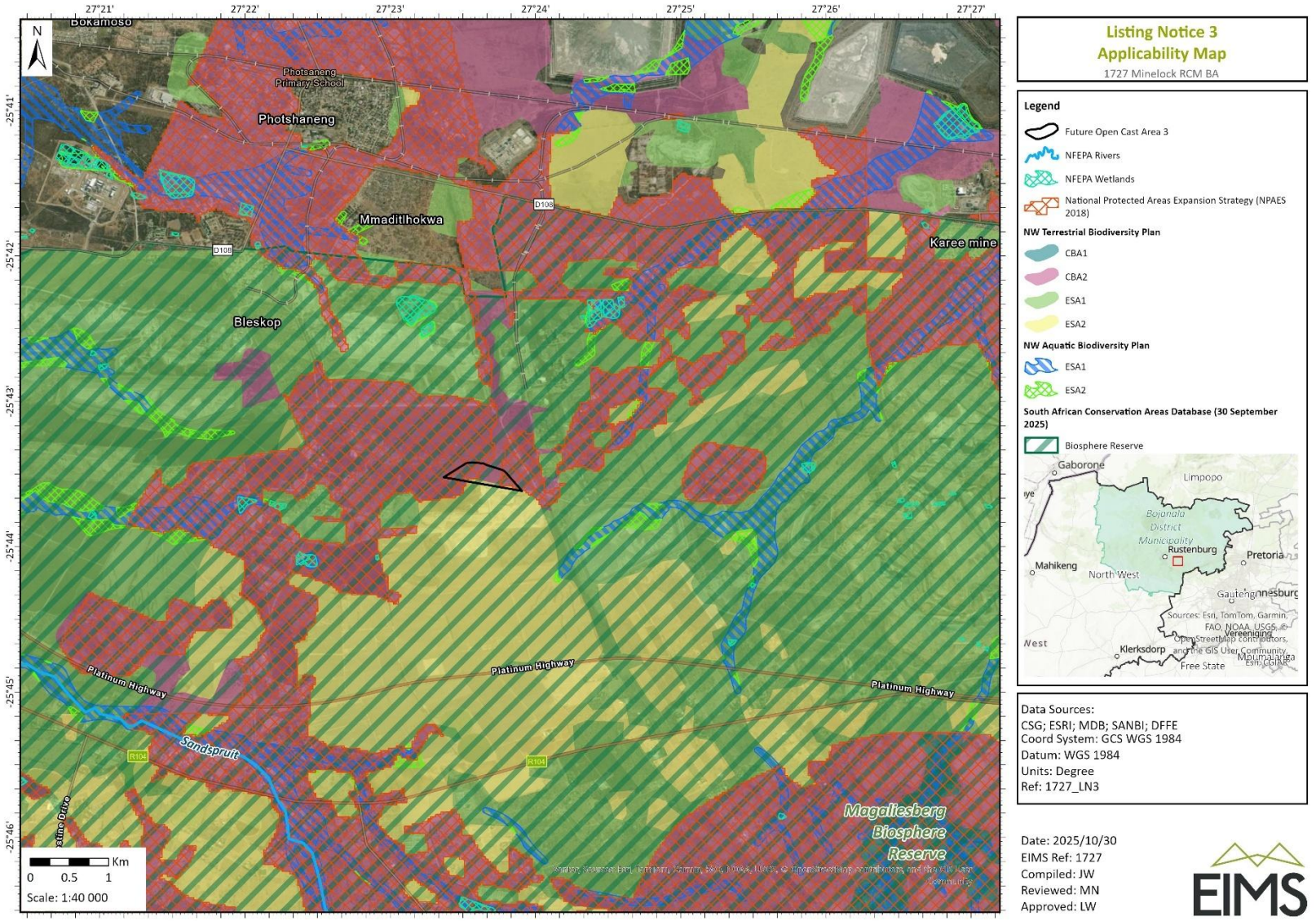


Figure 41: Desktop sensitivity of the project area.

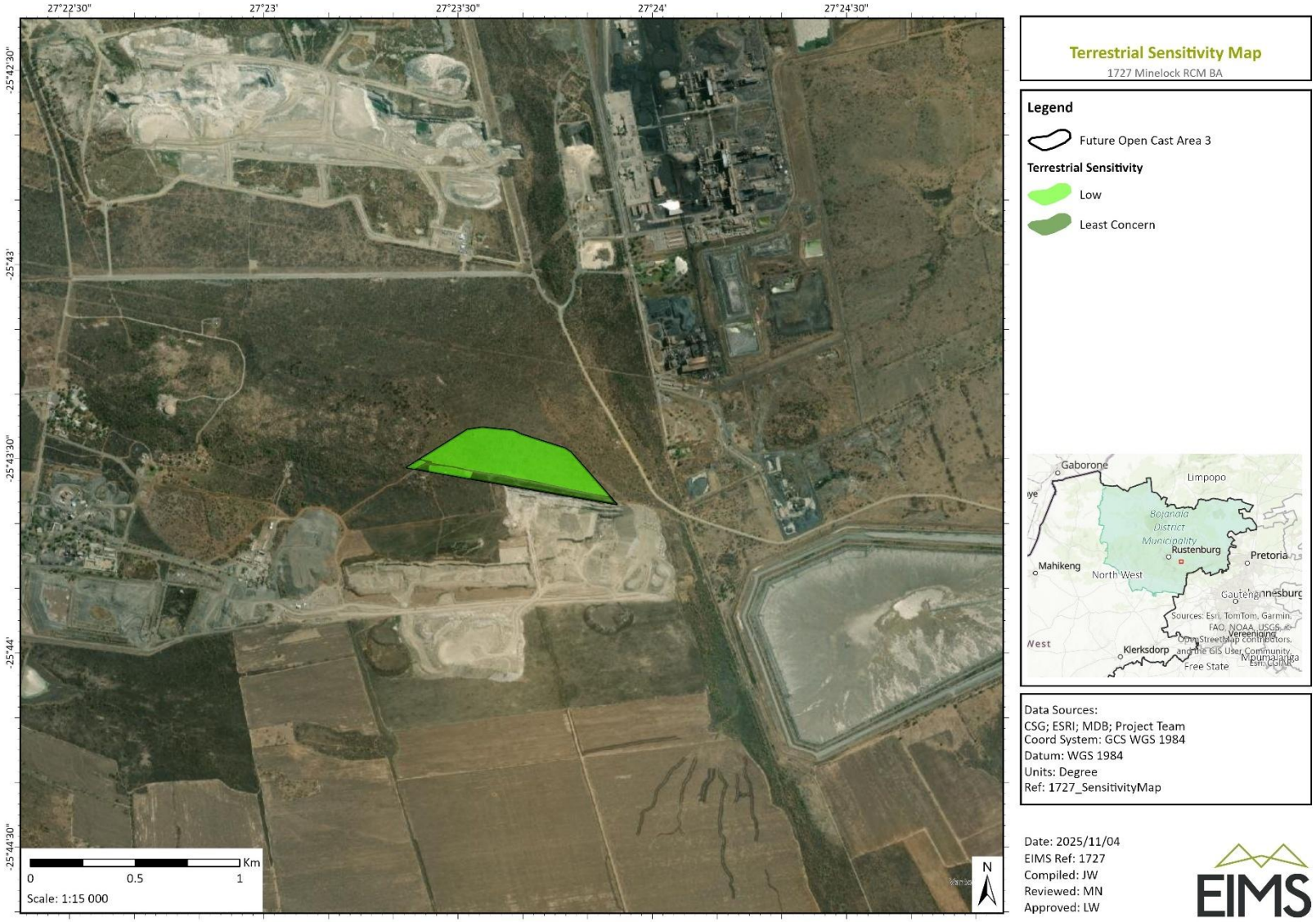


Figure 42: Terrestrial sensitivity of the project area (The Biodiversity Company, 2025)

7.10 SOCIO-ECONOMIC ENVIRONMENT

RCM operations are located within Rustenburg Local Municipality which is in the Bojanala District. The area also represents the largest economy in the North West Province. This section provides information provides input into the definition of receptor groups and their behaviour within the public exposure conditions.

7.10.1 DEMOGRAPHICS AND SOCIAL PROFILE

North West Province ranks seventh amongst the nine provinces in terms of population estimated at just over 3.5 million according to the Community Survey 2016. This represented a 1.5% growth since 2011. In 2022, the Provincial population growth was estimated at just over 4.1 million people. In terms of population distribution by sex, the province's population continues to be male-dominated. The estimated population of the province in 2022 was just over 3.8 million (StatsSA).

Bojanala Platinum District Municipality is one of the four District Municipalities in the North West Province situated to the east of the province. The District Municipality, whose seat is in Rustenburg City, comprises 17% of the total area of the province with a population of just over 1.67 million in 2022 representing 44% of the population of the Province. The foaur Local municipalities in the District are Rustenburg, Madibeng, Moses Kotane, Moretele, and Kgetleng River with Rustenburg having the largest population representing 34.6% of the District's total population (Figure 43).a In terms of number of households in the District, Rustenburg Local Municipality has the highest number of households (Figure 44).

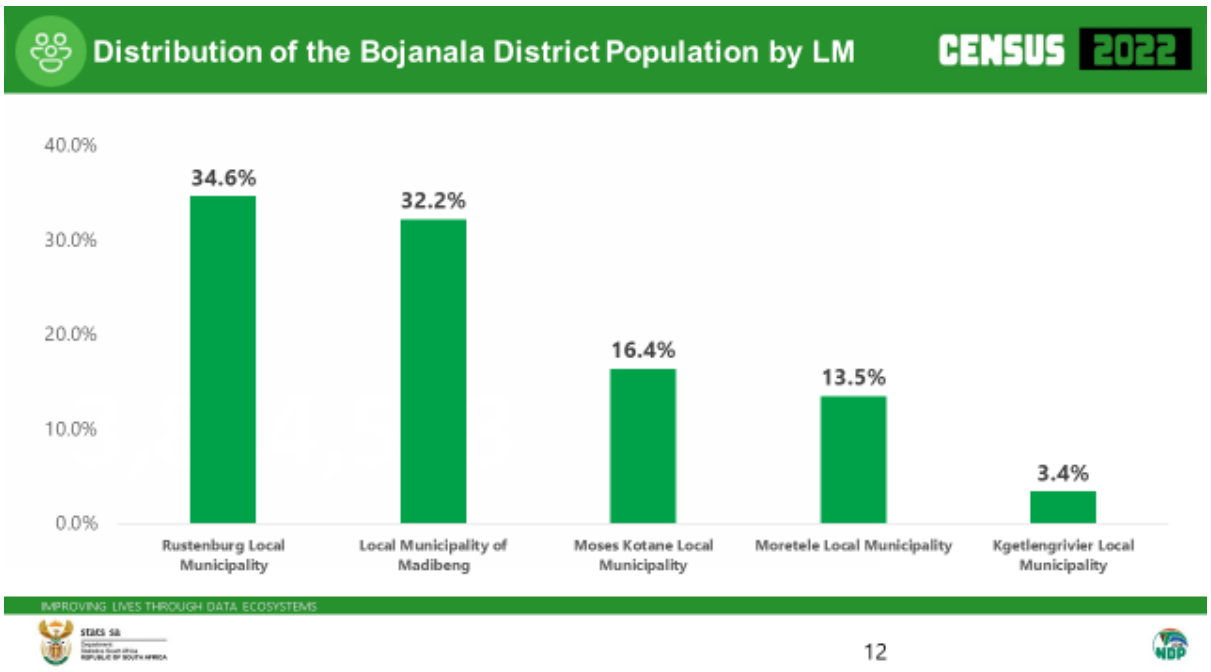


Figure 43: Distribution of Bojanala District Population by Local Municipality.

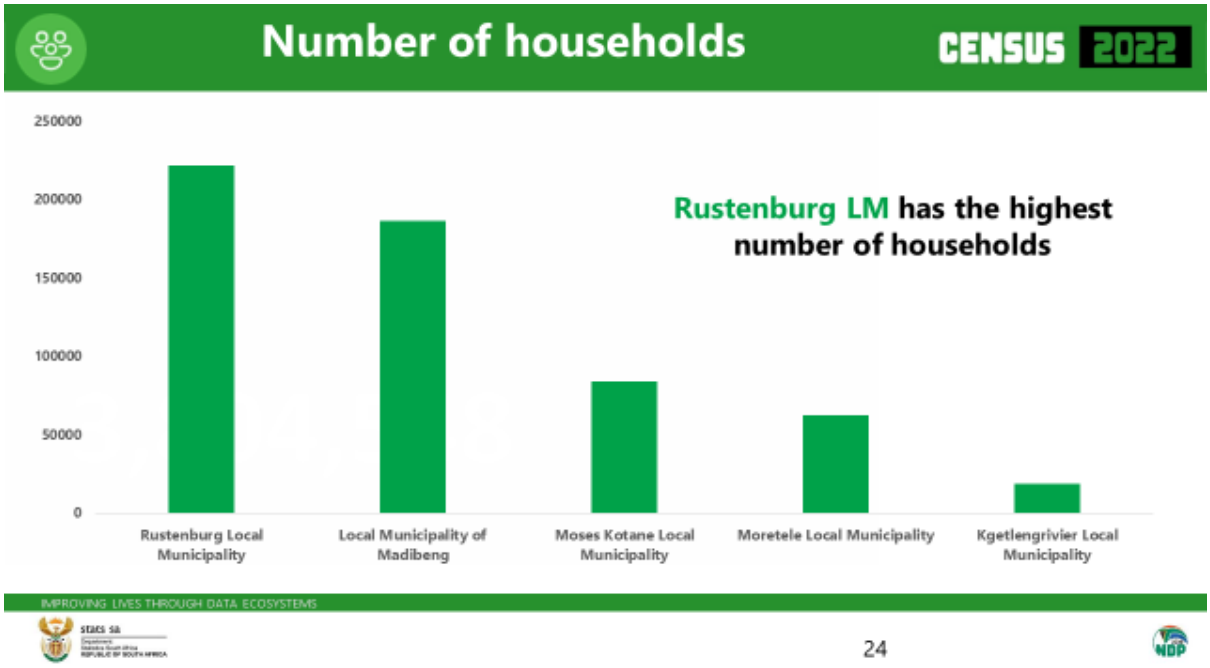


Figure 44: Number of households in Bojanala District Municipality by Local Municipality

In terms of other key indicators, Bojanala has close to 480,000 people living below the food poverty line which represents more than a quarter of the population at 26.1% in 2021. During the same period, the number of people aged 20 and above with matric was over 435 000 representing 23.9% of the population. Table 17 below highlights some of the socio-economic development indicators for Bojanala District in relation to the North West Province and the country in general.

Table 17: Some socio-economic indicators for Bojanala District in relation to the NW Province and SA

Abstract of KEY INDICATORS: South Africa, North West Province and NW District Municipalities (2021) (Source: IHS Markit; Regional Explorer 2294 (2.6q): Nov 2022)				
Category	Metric	SA	North West	Bojanala DM
Size of Area	(km²)	1 221 246	104 882	18 333
	% Share of Region		8,6%	17,5%
Demographic	Total population	59 646 053	4 095 248	1 820 994
	% Share of Region		6,9%	44,5%
	Population Growth Rate (%) 2020	1,5%	1,5%	1,6%
	Number of Households	16 820 584	1 226 035	587 937
Development	Human Development Index (HDI)	0,66	0,63	0,65
	Gini coefficient	0,64	0,63	0,62
	Poverty indicators			

Abstract of KEY INDICATORS: South Africa, North West Province and NW District Municipalities (2021) (Source: IHS Markit; Regional Explorer 2294 (2.6q): Nov 2022)				
	People below the food poverty line (StatsSA defined)	19 584 179	1 311 981	479 744
	2021%	32,46%	31,66%	26,01%
	Highest level of education: age 20+; Matric only	12 982 536	830 243	435 142
	Population density (number of people per km²)	49,40	39,51	100,61
	Urban Population Rate (%)	64,76%	46,55%	38,90%

Compared to the District's population increase of 16.2%, Rustenburg Local Municipality's population increased by 26.5% between 2016 and 2023 with the male population being higher than the female similar to the overall Province's population trend.

In terms of the age structure, the population aged between 15 and 64 represents over 71% of the total population in Rustenburg. 3.9% Of the population age 20 and above have no formal schooling with 8.2% of the same population group having attained higher education.

According to StatsSA, Rustenburg Local Municipality's total population increased by 26.5% between 2016 and 2023 as compared to 16.2% for Bojanala District during the same period. As is the case with the Province and the District, the male population is higher than the female population in Rustenburg. The Local Municipality's population was projected to increase to 870 996 in 2023 with about 70% of the population being the Economically Active Population (15-64).

In terms of education, 17,300 people aged 20 and above had no schooling in 2020. During the same period, 178,000 people had matric only.

According to the StatsSA Quarter Labour Force Surveys (QLFS) 2022 and 2023, the North West provincial unemployment recorded 36.8% in terms of the official definition of unemployment in the third quarter of 2022, representing an improvement compared to the 39% recorded during the third quarter in 2023. However, in terms of the expanded definition, the province continued to record the highest unemployment rate compared to all Provinces at 53.5% during the second quarter of 2023 compared to 53.3% in the second quarter of 2022.

The unemployment rate in the Bojanala District continued to increase with 24.5% recorded in 2012 and 48.1% in 2021 as reflected in the graph below. According to HIS Martik S&P Global (2022) (Bojanala District Municipality's 2024/25 IDP Review), the unemployment rate for Rustenburg Local Municipality has also been increasing recording 19.6% in 2012 and 41.7% in 2021.

In terms of access to basic services by the local municipality's residents, there has generally been improvement with access to electricity, water, sanitation and waste removal between the periods 2011 to 2016; and 2016 to 2022 (Table 18).

Table 18: Household services

	2022	2016	2011
Flush toilet connected to sewerage	72.8%	52.9%	56.2%
Weekly refuse removal	75.6%	67.1%	69.2%
Piped water inside dwelling	53.0%	28.5%	35.8%
Electricity for lighting	94.5%	83.7%	83.0%

Source: Extract from Municipalities of South Africa https://municipalities.co.za/overview/1191/rustenburg-local-municipality

7.10.2 RUSTENBURG LOCAL MUNICIPALITY'S INTEGRATED DEVELOPMENT PLAN (IDP) CONSIDERATION

In terms of the local municipality's IDP (5-Year IDP 2022-2027), the municipality identified its community needs and grouped them under the following areas: Safety; Education; Health; Public Works and Roads; Electricity; Social Services; and General. Furthermore, the municipality's IDP provided a list of projects per ward that the municipality has, or is going to, budget for. Several wards were not provided for in terms of the listed and funded projects and these included wards hosting communities within which RCM operates.

7.10.2.1 **LAND COVER AND USE**

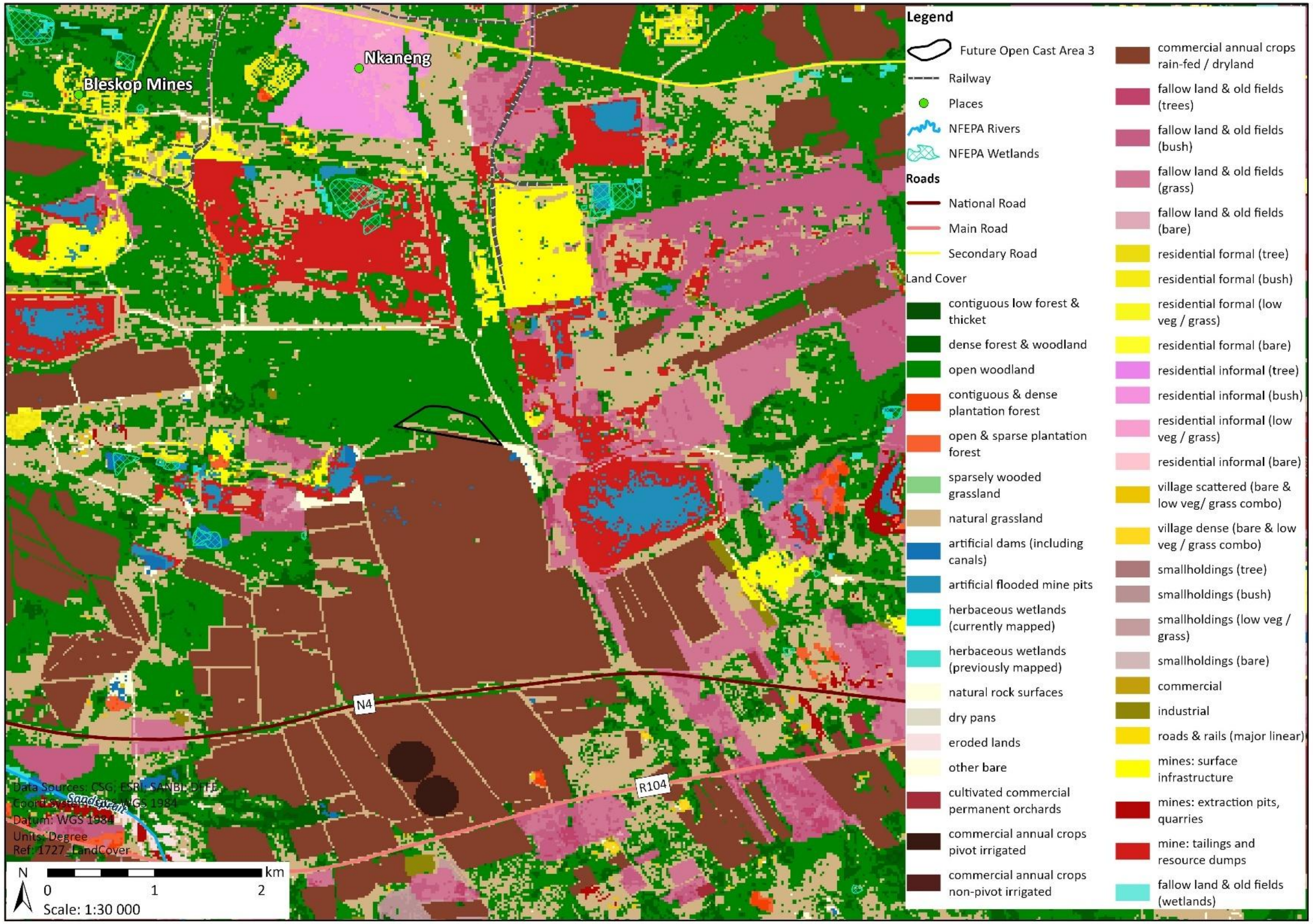
With reference to

Figure 45, the land cover surrounding RCM is characterized by a mix of mining-disturbed areas, natural vegetation, and agricultural land. Historically, the region has undergone significant land-use changes due to mining expansion:

- Mining Footprint: Large portions of the area are occupied by open-cast and underground chrome mining operations, tailings storage facilities, and associated infrastructure such as haul roads and processing plants.
- Natural Vegetation: The mine lies within the Savanna Biome, specifically the Marikana Thornveld vegetation type. This consists mainly of Acacia (Vachellia) species, mixed bushveld, and grassland patches.
- Agricultural Use: Surrounding farms are used for subsistence and commercial agriculture, including grazing and some crop cultivation.

Over the recent past woodland and grassland have decreased, with much of it converted to cultivated land or cleared for mining activities. Open mining areas have expanded significantly in the Rustenburg region due to chrome and platinum mining.

RCM is bounded to the north, east and west by mining operations, and to the south by cultivated land and the N4 freeway. The closes residential uses are located in the villages of Nkageng and Photsaneng (~3,5km to the north of the existing mine).



Nkaneng
Bleskop Mines
N4
R104
Datum: WGS 1984
Units: Degree
N
0 1 2 km
Scale: 1:30 000
Legend
Future Open Cast Area 3
Railway
Places
NFEPA Rivers
NFEPA Wetlands
Roads
National Road
Main Road
Secondary Road
Land Cover
contiguous low forest & thicket
dense forest & woodland
open woodland
contiguous & dense plantation forest
open & sparse plantation forest
sparsely wooded grassland
natural grassland
artificial dams (including canals)
artificial flooded mine pits
herbaceous wetlands (currently mapped)
herbaceous wetlands (previously mapped)
natural rock surfaces
dry pans
eroded lands
other bare
cultivated commercial permanent orchards
commercial annual crops pivot irrigated
commercial annual crops non-pivot irrigated
commercial annual crops rain-fed / dryland
fallow land & old fields (trees)
fallow land & old fields (bush)
fallow land & old fields (grass)
fallow land & old fields (bare)
residential formal (tree)
residential formal (bush)
residential formal (low veg / grass)
residential formal (bare)
residential informal (tree)
residential informal (bush)
residential informal (low veg / grass)
residential informal (bare)
village scattered (bare & low veg/ grass combo)
village dense (bare & low veg / grass combo)
smallholdings (tree)
smallholdings (bush)
smallholdings (low veg / grass)
smallholdings (bare)
commercial
industrial
roads & rails (major linear)
mines: surface infrastructure
mines: extraction pits, quarries
mine: tailings and resource dumps
fallow land & old fields (wetlands)

Figure 45: Land Cover of the Study and Surrounding Area

7.11 CULTURAL HERITAGE

The objective of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) is to introduce an integrated system for the management of national heritage resources. The Act defines a 'heritage resource' as any place or object of cultural significance (aesthetic, architectural, historical, scientific, social, spiritual, linguistic, or technological value or significance). The identification, evaluation and assessment of any cultural heritage site, artefact or find in South Africa is required by this Act. This section of the report presents the heritage status of the proposed RCM Open Cast Area 3 project. The information presented in this section was obtained from the Heritage Impact Assessment Report compiled by PGS Heritage (2025) attached in Appendix F.

7.12 REGIONAL HERITAGE

The examination of historical data and cartographic resources represents a critical tool for locating and identifying heritage resources and in determining the historical and cultural context of the study area. Relevant topographic maps and satellite imagery were studied to identify structures, possible BGG or archaeological sites present in the footprint area.

Historical topographic maps (1:50 000) and orthophotos for various years (1960 and 1968) were available for utilisation in the background study. These maps were assessed to observe the development of the area, as well as the location of possible historical structures and BGG. The study area was overlain on the map sheets to identify structures or graves situated within or immediately adjacent to the study area that could possibly be older than 60 years and thus protected under section 34 and 36 of the NHRA.

Figure 46 indicates several potential heritage features including mining infrastructure, shafts, huts and homesteads, trig beacons and farming infrastructure. No Late Iron Age (LIA) walling is indicated however, the orthophoto (Figure 47) indicates a large kraal on the eastern side of the koppie in the present study area and another on the northern side. Google satellite imagery for various years (2004-2025) indicates a vast network of LIA walling particularly on the southern and eastern side of the koppie during seasons with low vegetation cover (Figure 48). Overall, the progression of occupancy of the area during the Iron Age was succeeded by large-scale farming and eventually by mining, with each phase leaving its traces upon the landscape.

7.13 HERITAGE SCREENING

A heritage screening was conducted by means of the DFFE National Web-based Environmental Screening Tool as required GN 982. According to the heritage screening report, the project area has a Low Heritage Sensitivity with small patches of Very High and High (Figure 49). The fieldwork has shown that a number of archaeological and heritage resources were present in the area and thus have a higher rating than the original screening rating. This is in part due to the low resolution of the available data that the screening data is based on.

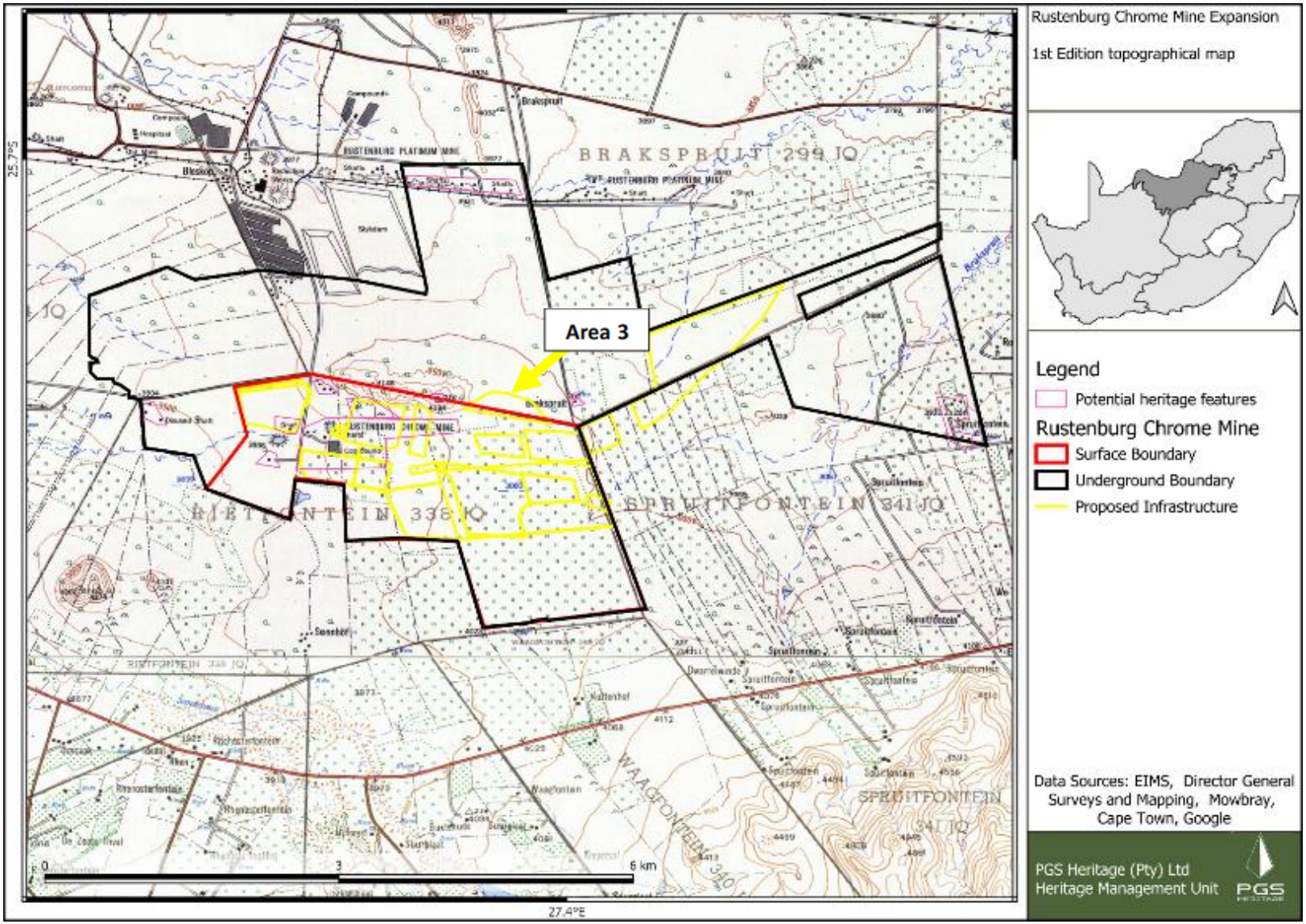


Figure 46: First Edition topographical map 2527CB (1968) with potential heritage features highlighted in pink (PGS Heritage, 2025)

Figure 47: Historical orthophoto (1960) of the area, with a zoomed in section of LIA walling visible on the eastern/northern side of the koppie (PGS Heritage, 2025)


Glover Alloys (LanXess Chrome)
Lanxess Mining (Pty) Ltd - Clinic
Image © 2025 Airbus

Figure 48: Iron Age walling identified through satellite imagery (PGS Heritage, 2025)

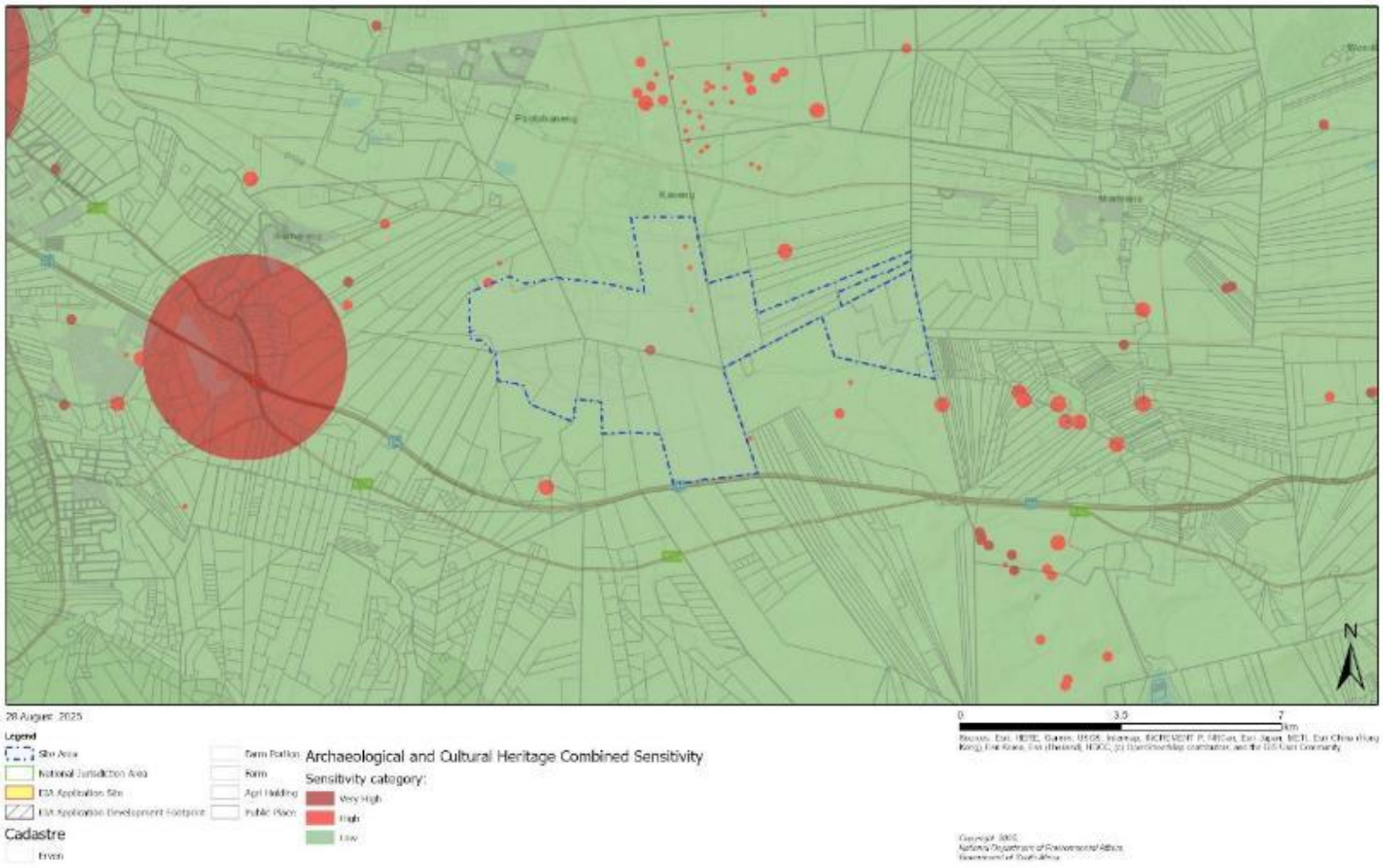


Figure 49: Screening tool map indicating a low- very high sensitivity rating for archaeology and heritage (PGS Heritage, 2025)

7.13.1 SITE-SPECIFIC HERITAGE

Analysis of maps and satellite imagery enabled the identification of possible heritage sensitive areas. By superimposition and analysis, it was possible to rate these structures according to age and thus their level of protection under NHRA. Table 19 lists the possible tangible heritage sites identified in the vicinity of the study area and the relevant legislative protection.

Table 19: Tangible heritage site in the study area and the adjacent area

Name	Description	Legislative protection
Archaeology	Older than 100 years	NHRA sections 3 and 35
Structures	Possibly older than 60 years	NHRA sections 3 and 34
Burial grounds	Graves	NHRA sections 3 and 36

Additionally, evaluation of satellite imagery has indicated the following areas that may be sensitive from a heritage perspective. The analysis of the studies conducted in the area assisted in the development of the following landform type to heritage find matrix (Table 20).

Table 20: Landform type to heritage find matrix

LANDFORM TYPE	HERITAGE TYPE
Crest and foot hill	LSA and MSA scatters, LIA settlements
Crest of small hills	Small LSA sites – scatters of stone artefacts, ostrich eggshell, pottery and beads
Water holes/pans/rivers	MSA and LSA sites, LIA settlements
Farmsteads	Historical archaeological material
Ridges and drainage lines	LSA sites, LIA settlements

During the initial fieldwork in March , a total of twenty-six heritage features and resources were identified (Figure 50, Figure 51, Figure 52 and Figure 53), forming part of a larger LIA occupation of the koppie in the proposed development area and consist of both varying density pottery scatters graded as IIIB/IIIC to NCW (Oc01-a, Oc01-b, Oc01-c, Oc01-d, Oc01-e, Oc01-f, Oc01-g, Oc01-m, Oc01-n, Oc01-o, and Oc01-p) and LIA walling (Oc01-h, Oc01-i, Oc01-j, Oc01-k, Oc01-l, Oc01-q, Oc01-r, Oc01-s, Oc01-t, Oc01-u, Oc01-v, Oc01-w, Oc01-x, Oc01-y and Oc01-z) graded as a IIIB.

During the follow-up fieldwork in September, an additional thirty-three heritage features were identified. Twenty-nine of these features were identified as LIA walling sites (Ex03, Ex05, Ex06, Ex07, Ex08, Ex09, Ex10, Ex11, Ex12, Ex13, Ex14, Ex15, Ex16, Ex17, Ex18, Ex19, Ex20, Ex21, Ex22, Ex23, Ex24, Ex25, Ex27, Ex28, Ex29, Ex30, Ex31, Ex32, Ex33 and Ex35) of varying degrees of preservation all forming part of a larger LIA occupation of the koppie, graded as IIB. Additionally, probable stone packed graves (Ex01) graded as IIIA, An ESA lithic scatter (Ex13) graded as IIIC, a historical homestead (Ex34), with a possibility of infant burials being present, graded as IIIB, and extensive historical walling (Ex03 and Ex04) where the building stones were reused from the LIA site complex were documented.

Numerous studies (Van Vollenhoven 2014; Higgit 2015; Tasker 2024) have also identified various other heritage resources including: 2 graveyards (Clo01 and Clo15), historical mining infrastructure (A mine shaft sunk in 1949 (De01), and a reservoir - Clo14), a historical homestead (Clo13), a past community settlement (Clo12a, Clo12b, Clo12c, 12d and Clo12e), an ungraded heritage site, MSA stone tool scatters (Ft/001, Clo06 and Clo11) and

further LIA occupation of the koppie in the study area (Ft/002, Ft/003, Ft/004, Ft/005, Ft/006, Ft/007, Clo02, Clo03, Clo04, Clo05, Clo07a, Clo07b, Clo08a, Clo08b, Clo09 and Clo10), as well as beyond the koppie (67, 68 and 69) (Refer: Figure 53). Desktop analysis (Figure 46; Figure 47; Figure 48.) further highlights the extent of LIA walling around the koppie and fieldwork has indicated that additional LIA walling is present, despite not being visible on satellite imagery. Historical mapping has also revealed a historical trigonometry beacon (De02) within the study area.

With the current project layout; LIA sites 67, 68, 69 are not located near any surface infrastructure and are therefore not at any risk of impact/disturbance by the currently proposed infrastructure. Additionally, for Clo15, a cemetery in the mining area that has already been fenced off by the mine, no impacts are foreseen.

In conclusion the following sites are located on the proposed expansion area 3 and are impacted by this application:

- Ex 04, Ex 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29. 30, 31, 32, 33, 34, Ft/005, Ft/006.

These sites mainly includes pottery, kraals, stonewalling and a lithics cluster. No graves were found during the site visit by the specialist, however, the potential exists for unknown graves sites or other heritage features.

Figure 50: Examples of heritage features (pottery) identified on site (PGS Heritage, 2025)

Figure 51: Examples of heritage features (iron age stonewalling) identified on site (PGS Heritage, 2025)

Figure 52: Examples of heritage features (potential graves) identified on site (PGS Heritage, 2025)

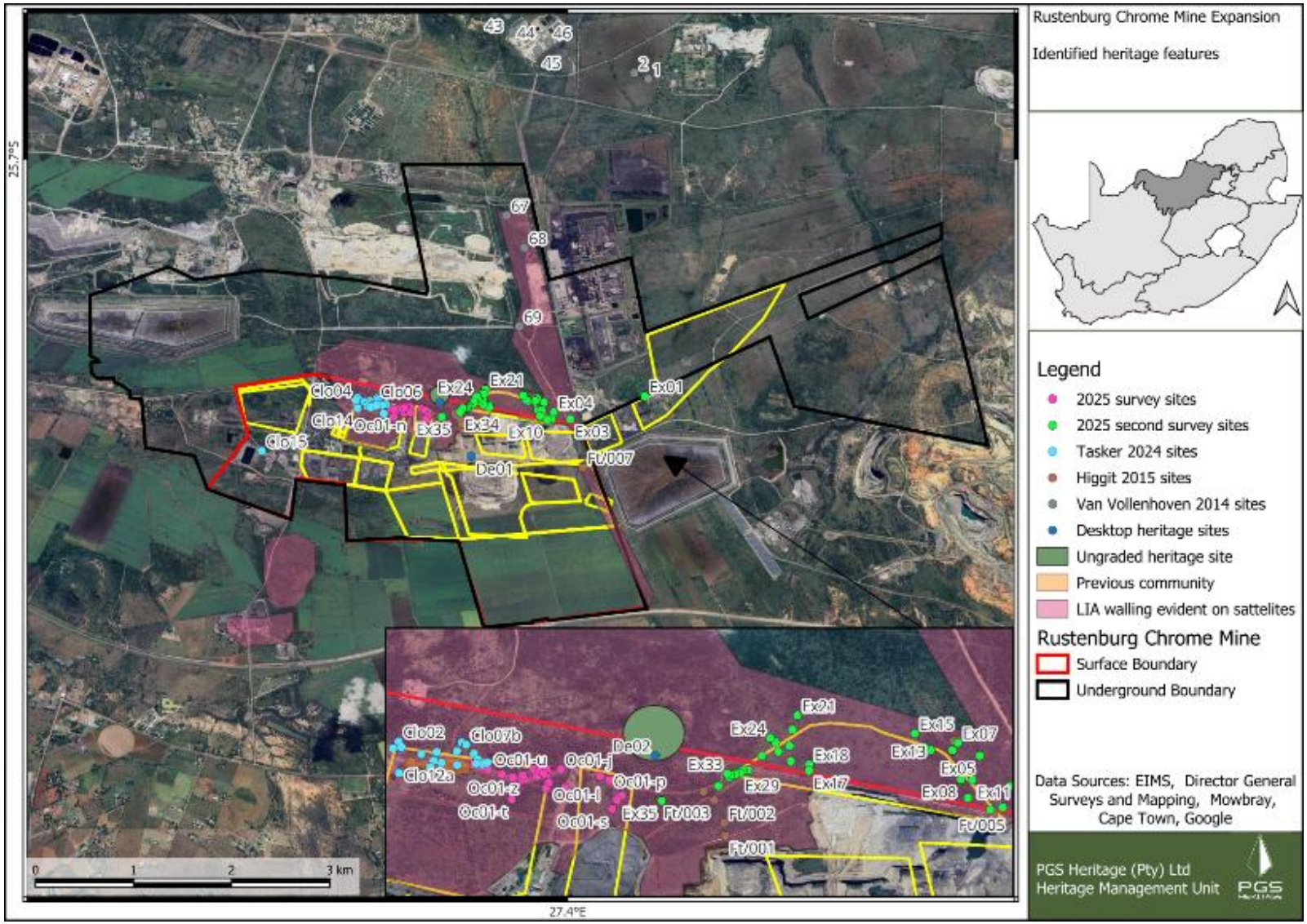


Figure 53: Identified heritage resources within and adjacent to the development area (PGS Heritage, 2025)

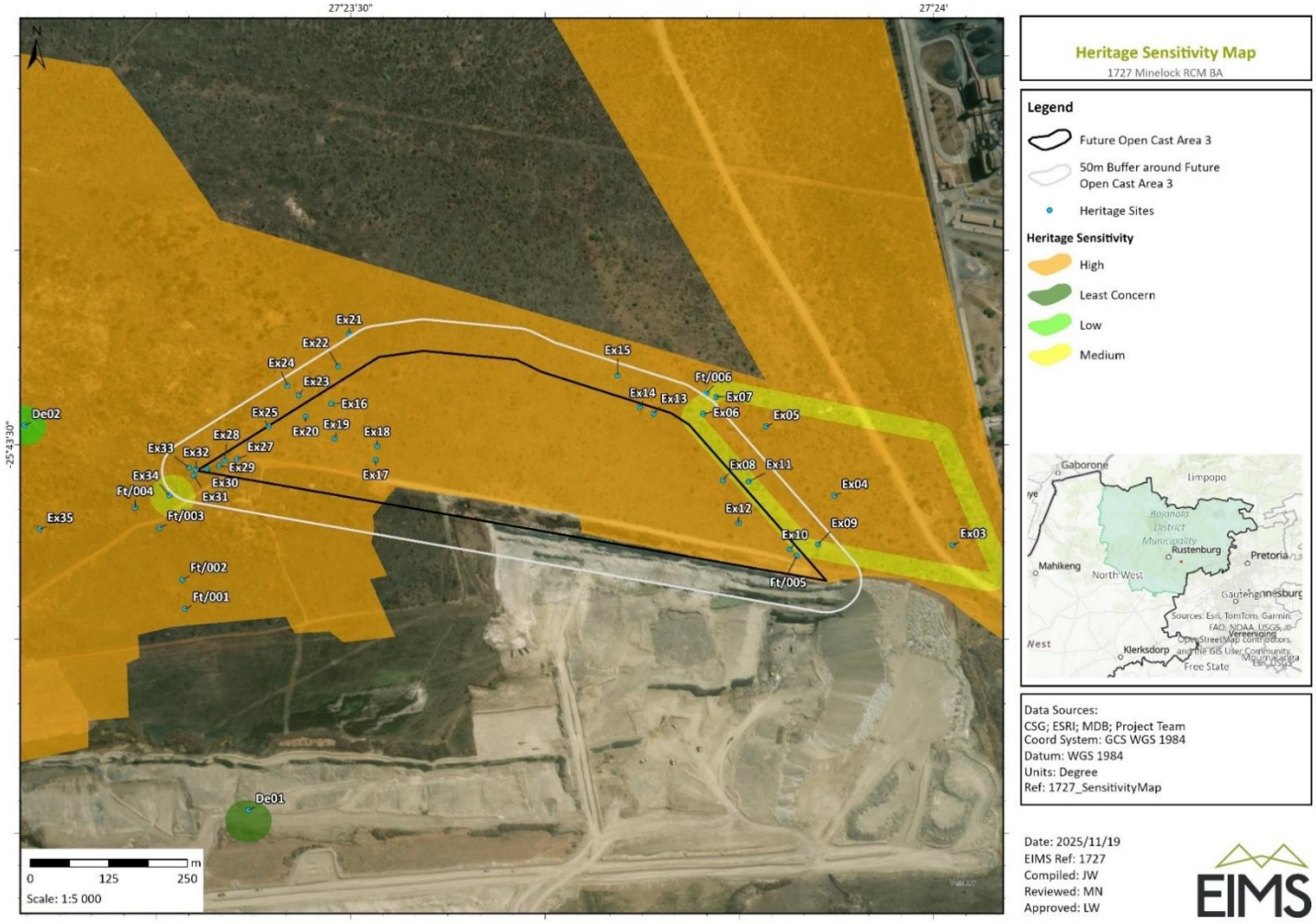


Figure 54: Identified heritage resources within Area 3 expansion areas and 50 m buffer zone around EX34[4].

[4] The proposed mitigation for these features includes that all features within the study area and within a 50 m buffer of the site, to be subjected to a Phase II Mitigation Process which include the application for destruction permits. Ex34 includes the homestead where there are Buriel grounds and is a no-go area. 50 m buffer around the site, must be maintained and the site protected.

7.14 PALAEONTOLOGY

Cultural Heritage in South Africa, including all heritage resources, is protected by the National Heritage Resources Act (Act 25 of 1999) (NHRA). Heritage resources as defined in Section 3 of the Act include "all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens". Palaeontological heritage is exceptional and non-renewable and is protected by the NHRA. Palaeontological resources and may not be unearthed, broken moved, or destroyed by any development without prior assessment and without a permit from the relevant heritage resources authority as per section 35 of the NHRA.

Geological and Palaeontological History

The geology of the study area is depicted on the 1:250 000 Rustenburg 2526 (1981) Geological Map in Figure 5 and Figure 8 (Section 7.2). The entire study area is underlain by Mathlagame Norite-Anorthosite (Vcm, green) and Bronzitite, Harzburgite and Norite (Vl, green) of the Rustenburg Layered Suite (Bushveld Complex). According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS) the Palaeontological Sensitivity of the Rustenburg Layered Suite (Bushveld Complex) is Zero (grey) (Almond and Pether, 2009; Almond et al., 2013, Groenewald et al 2014). The suggested location is classified as having a Medium (orange) Palaeontology Theme Sensitivity in the DFFE (Department of Forestry Fisheries and the Environment) Screening Report (Figure 55 and Figure 56 and Table 21).

Table 21: Palaeontological Sensitivity according to the SAHRIS PalaeoMap (Almond et al, 2013; SAHRIS website).

Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study; a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required
GREY	**INSIGNIFICANT/ZERO**	**No palaeontological studies are required**
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.
Colour	Sensitivity	Required Action

The DFFE Screening tool indicates a Medium (orange) Palaeontological sensitivity (Figure 55), while the Sensitivity SAHRIS Palaeosensitivity map indicates that the proposed development is underlain by sediments with a Zero (grey) Palaeontological Sensitivity (Figure 56). The above-mentioned Palaeontological Sensitivities required a desktop assessment being conducted and thus the Palaeontological Sensitivity was not verified by a site investigation. However, desktop research has indicated that the proposed Mine Expansion has a Low to Zero Palaeontological Sensitivity. Desktop research (National Database and published data) concluded that fossil heritage of scientific and conservational interest in the development area is rare.

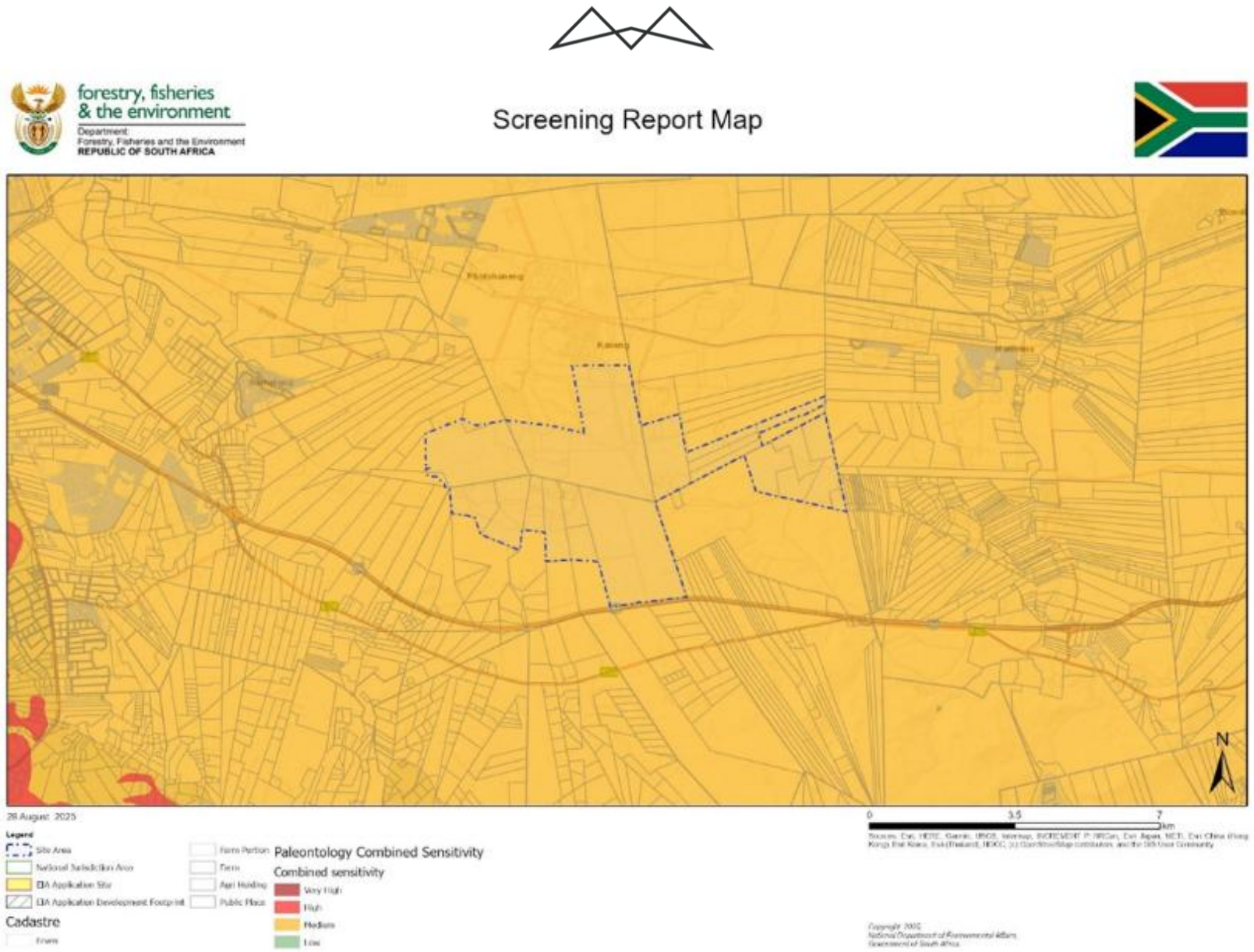


Figure 55: The DFFE screening tool's indication of a medium palaeontological sensitivity of the development area (PGS Heritage, 2025)

Figure 56: Extract of the SAHRIS PalaeoMap (Council of Geosciences, Pretoria indicting the Zero (grey) Palaeontological Sensitivity of the proposed Rustenburg Mine Expansion in the North West Province (Banzai Environmental, 2025)

8 ENVIRONMENTAL IMPACT ASSESSMENT

This section aims to identify and do an assessment on the potential environmental impacts associated with the proposed RCM project. This impact assessment will be used to guide the identification and selection of preferred alternatives, and management and mitigation measures, applicable to the proposed activities.

8.1 THE IMPACT ASSESSMENT METHODOLOGY

The impact significance rating methodology, as presented herein is guided by the requirements of the NEMA EIA Regulations 2014 (as amended). The broad approach to the significance rating methodology is to determine the significance (S) of an environmental risk or impact by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relating this to the probability/ likelihood (P) of the impact occurring. The S is determined for the pre- and post-mitigation scenario. In addition, other factors, including cumulative impacts and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the S to determine the overall final significance rating (FS). The impact assessment will be applied to all identified alternatives.

8.1.1 DETERMINATION OF ENVIRONMENTAL RISK

The final significance (FS) of an impact or risk is determined by applying a prioritisation factor (PF) to the post-mitigation environmental significance. The significance is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and Reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$\boldsymbol{C = \frac{(E + D + M + R) * N}{4}}$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 22 below.

Table 22: Criteria for Determining Impact Consequence

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. Highly localised, limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property or site boundary, or the area within a few hundred meters of the site)
	3	Local (i.e. beyond the site boundary within the Local administrative boundary (e.g. Local Municipality) or within consistent local geographical features, or the area within 5 km of the site)
	4	Regional (i.e. Far beyond the site boundary, beyond the Local administrative boundaries within the Regional administrative boundaries (e.g. District Municipality), or extends into different distinct geographical features, or extends between 5 and 50 km from the site).

Aspect	Score	Definition
	5	Provincial / National / International (i.e. extends into numerous distinct geographical features, or extends beyond 50 km from the site).
Duration	1	Immediate (<1 year, quickly reversible)
	2	Short term (1-5 years, less than project lifespan)
	3	Medium term (6-15 years)
	4	Long term (15-65 years, the impact will cease after the operational life span of the project)
	5	Permanent (>65 years, no mitigation measure of natural process will reduce the impact after construction/ operation/ decommissioning).
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected)
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected, or affected environmental components are already degraded)
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; moderate improvement for +ve impacts; or where change affects area of potential conservation or other value, or use of resources).
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease; high improvement for +ve impacts; or where change affects high conservation value areas or species of conservation concern)
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease, substantial improvement for +ve impacts; or disturbance to pristine areas of critical conservation value or critically endangered species)
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring very high time and cost.
	5	Irreversible Impact.

Once the C has been determined, the significance is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/ scored as per Table 23.

It is noted that both environmental risks as well as environmental impacts should be identified and assessed. Environmental Risk can be regarded as the potential for something harmful to happen to the environment, and in many instances is not regarded as something that is expected to occur during normal operations or events (e.g. unplanned fuel or oil spills at a construction site). Probability and likelihood are key determinants or variables of environmental risk. Environmental Impact can be regarded as the actual effect or change that happens to the environment because of an activity and is typically an effect that is expected from normal operations or events (e.g. vegetation clearance from site development results in loss of species of concern). Typically, the probability of an unmitigated environmental impact is regarded as highly likely or certain (management and mitigation measures would ideally aim to reduce this likelihood where possible). In summary, environmental risk is about what could happen, while environmental impact is about what does happen.

Table 23: Probability/ Likelihood Scoring

Probability	2	Low probability (Unlikely, impact could occur but not realistically expected; >5% and <20% chance).
	3	Medium probability (Possible, the impact may occur; >20% and <50% chance).
	4	High probability (Likely, it is most probable that the impact will occur- > 50 and <90% chance).
	5	Definite (Almost certain, the impact is expected to, or will, occur, >90% chance).

The result is a qualitative representation of relative significance associated with the impact. Significance is therefore calculated as follows:

$$S = C \times P$$

Table 24: Determination of Significance

Consequence	5- Very High[5]	5	10	15	20	25
	4- High	4	8	12	16	20
	3- Medium	3	6	9	12	15
	2- Low	2	4	6	8	10
	1- Very low	1	2	3	4	5
		1- Improbable	2- Low	3- Medium/ Possible	4- High/ Probable	5- Highly likely/ Definite
	Probability					

[5] In the event that an impact or risk has very high or catastrophic consequences, but the likelihood/ probability is low, then the resultant significance would be Low-medium. This does in certain instances detract from the relative important of this impact or risk and must consequently be flagged for further specific consideration, management, mitigation, or contingency planning.

The outcome of the significance assessment will result in a range of scores, ranging from 1 through to 25. These significance scores are then grouped into respective classes as described in Table 25.

Table 25: Significance Scores

S Score	Description
≤4.25	Low (i.e. where this impact is unlikely to be a significant environmental risk/ reward).
>4,25, ≤8.5	Low-Medium (i.e. where the impact could have a significant environmental risk/ reward).
>8.5, ≤13.75	High-Medium (i.e. where the impact could have a significant environmental risk/ reward).
>13.75	High (i.e. where the impact will have a significant environmental risk/ reward).

The impact significance will be determined for each impact without relevant management and mitigation measures (pre-mitigation significance), as well as post implementation of relevant management and mitigation measures (post-mitigation significance). This allows for a prediction in the degree to which the impact can be managed/mitigated.

8.1.2 IMPACT PRIORITISATION

Further to the assessment criteria presented in the section above, it is necessary to consider each potentially significant impact in terms of:

- Cumulative impacts; and
- The degree to which the impact may cause irreplaceable loss of resources.

To ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impacts' post-mitigation significance (post-mitigation). This prioritisation factor does not aim to detract from the significance ratings but rather to focus the attention of the decision-making authority on the higher priority/significance issues and impacts. The PF will be applied to the post-mitigation significance based on the assumption that relevant suggested management/mitigation impacts are implemented.

Table 26: Criteria for Determining Prioritisation

Cumulative Impact (CI)	**Low (1)**	**Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.**
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/ definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable Loss of Resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.

	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in Table 26Table 27. The impact priority is therefore determined as follows:

$$\boldsymbol{Priority = CI + LR}$$

The result is a priority score which ranges from 2 to 6 and a consequent PF ranging from 1 to 1.5 (Refer to Table 27).

Table 27: Determination of Prioritisation Factor

Priority	Prioritisation Factor
2	1
3	1.125
4	1.25
5	1.375
6	1.5

In order to determine the final impact significance (FS), the PF is multiplied by the post-mitigation significance scoring. The ultimate aim of the PF is an attempt to increase the post mitigation environmental risk rating by a factor of 0.5, if all the priority attributes are high (i.e. if an impact comes out with a high medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a higher significance).

Table 28: Final Environmental Significance Rating

Significance Rating	Description
<-25	**Very High (Impacts in this class are extremely significant and pose a very high environmental risk. In certain instances these may represent a fatal flaw. They are likely to have a major influence on the decision and may be difficult or impossible to mitigate. Offset's may be necessary.**
<-13.75 to -25	High negative (These impacts are significant and must be carefully considered in the decision-making process. They have a high environmental risk or impact and require extensive mitigation measures).
-8.5 to -13.75	Medium-High negative (i.e. Impacts in this class are more substantial and could have a significant environmental risk. They may influence the decision to develop in the area and require more robust mitigation measures).

Significance Rating	Description
<-4.25 to <-8.5	Medium- Low negative (i.e. These impacts are slightly more significant than low impacts but still do not pose a major environmental risk. They might require some mitigation measures but are generally manageable).
-1 to -4.25	Low negative (i.e. Impacts in this class are minor and unlikely to have a significant environmental risk. They do not influence the decision to develop in the area and are typically easily mitigated.
0	No impact
1 to 4.25	Low positive
>4.25 to <8.5	Medium-Low positive
8.5 to 13.75	Medium-High positive
>13.75	High positive

The significance ratings and additional considerations applied to each impact will be used to provide a quantitative comparative assessment of the alternatives being considered. In addition, professional expertise and opinion of the specialists and the environmental consultants will be applied to provide a qualitative comparison of the alternatives under consideration. This process will identify the best alternative for the proposed project.

8.2 IMPACTS IDENTIFIED

This Section presents the potential impacts that have been identified during the basic assessment. It should be noted that this report will be made available to I&AP's for review and comment and their comments and concerns will be addressed in the final BAR submitted to the CA for adjudication.

Potential environmental impacts were identified during the BA. These impacts were identified by the EAP and the appointed specialists. Table 29 provides the list of potential impacts identified.

Without proper mitigation measures and continual environmental management, most of the identified impacts may potentially become cumulative, affecting areas outside of their originally identified zone of impact. The potential cumulative impacts have been identified, evaluated, and mitigation measures suggested.

When considering cumulative impacts, it is important to bear in mind the scale at which different impacts occur. There is potential for a cumulative effect at a broad scale, such as regional deterioration of air quality, as well as finer scale effects occurring in the area surrounding the activity. The main impacts which have a cumulative effect on a regional scale are related to the transportation vectors that they act upon. For example, air movement patterns result in localised air quality impacts having a cumulative effect on air quality in the region. Similarly, water acts as a vector for distribution of impacts such as contamination across a much wider area than the localised extent of the impacts source. At a finer scale, there are also impacts that have the potential to result in a cumulative effect, although due to the smaller scale at which these operate, the significance of the cumulative impact is lower in the broader context.

Table 29: Identified environmental impacts

Main Activity / Action / Process	Ancillary Activity	Geo-physical (geology, topography, air, water)	Biological	Socio-economic	Heritage and cultural
Site preparation (Construction)	Vegetation clearance Topsoil stripping	○ Erosion ○ Dust pollution ○ Sedimentation	○ Temporary disturbance of wildlife	○ Dust ○ Noise	○ Disturbance/ destruction of archaeological sites or historic structures (if any).
Human resources management (Construction)	Employment/recruitment I&AP consultations Environmental awareness training HIV/AIDS Awareness programmes Integration with Municipalities' strategic long-term planning			○ Employment opportunities. ○ Health impacts.	
Earthworks (Construction)	Stripping and stockpiling of soils Levelling, grubbing and bulldozing Removal of waste and cleared vegetation Establishing storm water management measures	○ Erosion due to storm water runoff ○ Soil compaction and erosion due to topsoil stripping ○ Surface and ground water contamination ○ Loss of fertility ○ Loss of flow paths ○ Emissions and dust ○ Impacts on wetlands	○ Loss/ destruction of natural habitat and potential of loss of Species of Conservation Concern (SCC) ○ Introduction/ Invasion by Alien Species ○ Displacement of faunal species	○ Nuisance and impact on sense of place (i.e. noise, dust, etc.). ○ Safety and security (i.e. access to properties, theft, fire hazards, etc.). ○ Health impacts due to dust and noise ○ Perceptions and expectations	○ Disturbance/ destruction of archaeological sites or historic structures ○ Disturbance/ destruction of fossils

Main Activity / Action / Process	Ancillary Activity	Geo-physical (geology, topography, air, water)	Biological	Socio-economic	Heritage and cultural
	Establishment of firebreak			○ Employment opportunities	
Opencast Mining **(Construction and Operation)**	Land clearing (scraping, dozing, excavating) Materials handling (i.e. tipping, off-loading and loading, conveyor transfer points) Vehicle entrainment from haul roads Drilling and blasting Generation of general and hazardous waste Handling and storage of hazardous substances used in mining Emissions	○ Particulates and dust emissions, with small amounts of oxides of nitrogen (NOx), carbon monoxide (CO), SO_2, methane and CO^2 being released during blasting operations; ○ Soil erosion from wind over open areas ○ Surface and groundwater contamination. ○ Water and soil pollution due to hazardous and general waste inappropriately handled.	○ Disturbance of fauna due to accidental killing, noise, vibration, fly rock and dust, as well a lighting on nocturnal animals ○ Impact of dust and particulate matter emissions on surrounding vegetation and agricultural crops and farm animals.	○ Noise and vibration. ○ Impact of emissions, noise, vibration, fly rock, on surrounding land uses including agriculture and residential areas and single homesteads. ○ Health and safety of surrounding residents and employees of the mine.	○ Potential destruction of adjacent sensitive heritage features.

Main Activity / Action / Process	Ancillary Activity	Geo-physical (geology, topography, air, water)	Biological	Socio-economic	Heritage and cultural
	Maintenance and management of stormwater system				
	Pollution control dams				
	Handling and storage of hazardous substances				
	Crushing, screening, hauling of ore				
	Maintenance and management of stormwater system				
	Water management				
Closure and Rehabilitation of mining area (Decommissioning and Closure)	Revegetation	○ Emissions and dust ○ Impacts on surface and/or groundwater ○ Soil erosion	○ Alien and invasive species ○ Impacts on faunal species.	○ Safety and security (i.e. access to properties, theft, fire hazards, etc.). ○ Perceptions and expectations ○ Dust ○ Loss of permanent employment ○ Temporary employment creation	
	Slope stabilisation				
	Erosion control				
	Water resource management				
	Backfilling of open cast areas.				
Maintenance (Post closure)	Initiate maintenance and aftercare program	○ Emissions and dust ○ Erosion	○ Alien and invasive species	○ Site security and access control	

Main Activity / Action / Process	Ancillary Activity	Geo-physical (geology, topography, air, water)	Biological	Socio-economic	Heritage and cultural
	Environmental aspect monitoring	○ Surface and groundwater quality	○ Vegetation establishment		

8.3 DESCRIPTION AND ASSESSMENT OF IMPACTS

The following potential impacts were identified during the BA phase assessment and were assessed in terms of nature, significance, consequence, extent, duration and probability. These impact descriptions and calculations will be subject to amendment based on the results of public consultation undertaken during the BA phase. Mitigation / management measures to minimise potential negative impacts or enhance potential benefits are put forward in this report and will be adjusted where relevant once input from the public has been considered. Table 30 provides a summary of the impact assessment and significance ratings and mitigation measures.

8.3.1 CONSTRUCTION PHASE IMPACTS

8.3.1.1 **AIR QUALITY**

#1[6]: Air pollution as a result from dust generation activities and gaseous emissions from vehicles and equipment.

Potential existing impacts on air quality was identified through documentation received from the applicant and the specialist baseline information on air quality for another recent project for the mine. Sources of emissions from the baseline include active ventilation shafts, materials handling points, crushing and screening, vehicle entrainment on unpaved roads, and windblown dust from the topsoil and ore stockpiles, TSF, WRD and existing opencast areas within RCM operation as well as from surrounding mining operations.

Existing sources of emissions near the study area include mining and processing activities, farming and residential land-uses that occur in the region. These land-uses contribute to baseline pollutant concentrations via vehicle tailpipe emissions, household fuel combustion, biomass burning and various fugitive dust sources. Long-range transport of particulates, emitted from remote tall stacks and from large-scale biomass burning in countries to the north of South Africa, has been found to contribute to background fine particulate concentrations within the South African boundary (Andreae, *et al*., 1996; Garstang, Tyson, Swap, & Edwards, 1996; Piketh, Annegarn, & Kneen, 1996) (Airshed, 2025).

Fugitive emissions from opencast and underground mining operations typically comprise of land clearing operations (i.e. scraping, dozing and excavating), materials handling operations (i.e. tipping, off-loading and loading, conveyor transfer points), vehicle entrainment from haul roads, wind erosion from open areas, drilling and blasting. These activities mainly result in particulates and dust emissions, with small amounts of oxides of nitrogen (NOx), carbon monoxide (CO), SO_2, methane and CO^2 being released during blasting operations.

Tharisa Chrome and Platinum mine is located approximately 5 km to the east of RCM's surface boundary with a dormant mine directly to the east. Samancor western chrome mine is roughly 8 km to the east. Further afield are Bleskop Mines, Kroondal Mine, and Rustenburg Platinum Mine. Anglo Platinum Smelter Operation (Waterval Smelter) and Impala Platinum are all located around Rustenburg, about 20 km to the west-northwest. Rhovan Vanadium is to the north of Brits and Vanchem to the east, both with associated mining operations. Most of the smelters have mining operations associated with it, with tailings storage facilities, unpaved roads and other materials handling activities generating dust.

Air pollution from vehicle emissions may be grouped into primary and secondary pollutants. Primary pollutants are those emitted directly into the atmosphere, and secondary, those pollutants formed in the atmosphere as a result of chemical reactions, such as hydrolysis, oxidation, or photochemical reactions. Notable primary pollutants emitted by vehicles include CO^2, CO, hydrocarbons (HCs), SO_2, NOx, DPM and Pb. Secondary pollutants include: NO_2, photochemical oxidants (e.g. ozone), HCs, sulphur acid, sulphates, nitric acid, nitric acid and nitrate aerosols. Hydrocarbons emitted include benzene, 1.2-butadiene, aldehydes and polycyclic aromatic hydrocarbons (PAH). Benzene represents an aromatic HC present in petrol, with 85% to 90% of benzene emissions emanating from the exhaust and the remainder from evaporative losses. Vehicle tailpipe emissions are localised sources and unlikely to impact far-field. Both small and heavy private and industrial vehicles travelling along the N4 as well as the unpaved roads, are notable sources of vehicle tailpipe emissions.

[6] *These numbers refers to the identifier of each impact in the impact assessment summary in Table 30.*

Additional air quality impacts that will result from the construction of the opencast expansion at the mine during the construction phase, will involve dust generation activities such as land clearing, vehicle entrainment on gravel and temporary roads and from wind erosion on bare areas and from vehicle emissions from construction vehicles.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially and temporally. The significance rating for this impact was rated as medium-high pre-mitigation, but can be reduced to medium-low post-mitigation, mainly by reducing the extent and magnitude of the impact. The impact is unlikely to cause an irreplaceable loss of resources and the cumulative impact is rated as low. The final significance is therefore medium-low. Mitigation measures are listed in Table 30.

8.3.1.2 NOISE & VIBRATION

#4: Increased noise and vibrations from earth-moving equipment affecting nearby communities and wildlife.

Existing impacts from noise and vibration in and near the study area is mainly caused by insects, vehicles and mining machinery (Airshed, 2025).

Additional noise and vibration impacts that will result from the construction of the new infrastructure at the mine during the construction phase, will involve vibration and noise from earth-moving equipment and vehicles for the removal of vegetation and land clearing and other construction vehicles.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially and temporally. The significance rating for this impact was rated as medium-high pre-mitigation, but can be reduced to low post-mitigation, mainly by reducing the magnitude and probability ratings of the impact. The impact is unlikely to cause an irreplaceable loss of resources and the cumulative impact is rated as low. The final significance is therefore low. Mitigation measures are listed in Table 30.

8.3.1.3 TERRESTRIAL BIODIVERSITY

The following potential impacts on the biodiversity were identified and considered for the construction phase of the mine project. This phase refers to the period during construction when the proposed infrastructure is constructed or upgraded. This phase usually has the largest direct impact on biodiversity. The following potential impacts to terrestrial biodiversity were considered.

#7: Destruction, loss and fragmentation of the vegetation community and potential Species of Conservation Concern.

Through site clearing, more of the vegetation communities will be lost. Unmitigated, this will also lead to habitat fragmentation and the establishment of alien invasive species as well as soil erosion.

- Activities that will contribute to this impact:
    - Driving/ moving outside of designated areas;
    - Physical removal of vegetation;
    - Soil dust precipitation as a result of site establishment; and
    - Hydrocarbon storage and leakages.
- Cumulative Impacts
    - Further loss of EN vegetation type.
- Irreplaceable Loss of Resources

Irreplaceable loss of the following resources:

- Potential loss of SCC;

- Loss of EN vegetation type; and
- Loss of CBA, ESA and NPAES areas.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially. However, the mine expands into a CBA2 area, which was previously not the case and the cumulative encroachment impact on the remaining EN vegetation type. This impact requires more stringent mitigation or offset measures as indicated in Table 30 and the EMPr, in order to mitigate the impact, by enhancing the remaining areas of these EN vegetation type. The significance rating for this impact was rated as high pre-mitigation, but can be reduced to medium-low post-mitigation, mainly by reducing the duration, reversibility and probability ratings of the impact. The impact may result in the irreplaceable loss of resources, but the value of these resources is limited and the cumulative impact is rated as low. The final significance is therefore higher and rated as high. Mitigation measures are listed in Table 30.

#8: Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, light, dust, vibration and poaching) and potential loss of Species of Conservation Concern.

Faunal community will be influenced in a number of ways, including the loss of habitat, disturbances that will either make them move out of the area if possible or have to adapt and possible deaths due to physical harm or indirect harm.

- Activities that will contribute to this impact:
  - Clearing of vegetation;
  - Roadkill due to vehicle collision;
  - Pollution of water resources due to dust effects and run-off;
  - Intentional killing of fauna for food (hunting) or otherwise (killing of snakes);
  - Disease caused by increased dust levels; and
  - Vibrations, noise and rock chips skidding out due to the construction activities.
- Cumulative Impacts
  - Loss of viable habitat.
- Irreplaceable Loss

Irreplaceable loss of the following resources:

- Potential loss of SCC;
- Loss of usable water resources for fauna species resulting in loss of fauna species.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially and temporally. The significance rating for this impact was rated as medium-high pre-mitigation, but can be reduced to a lower medium-low rating post-mitigation, mainly by reducing the magnitude and the probability of the impact. The impact may result in an irreplaceable loss of resources, but the value of these resources is limited, and the cumulative impact is rated as medium. The final significance is therefore a slightly higher medium-low rating. Mitigation measures are listed in Table 30.

#9: Clearing of vegetation leading to soil erosion and loss of topsoil

The clearing of vegetation could lead to soil erosion the removal/ relocation of the topsoil and the destruction of habitat.

- Activities that will contribute to this impact:
  - Storm water runoff from roads, and other paved areas;

- Vehicles driving outside demarcated areas;
- Footpaths outside demarcated areas;
- Clearing of vegetation;
- Water runoff from areas with bare soil; and
- Compacting of roads.

- Cumulative Impacts
  - Removal of topsoil; and
  - Loss of habitat for indigenous species.
- Irreplaceable Loss of Resources

Irreplaceable loss of the following resources:

- Loss of CBA, ESA and NPAES areas.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially. The significance rating for this impact was rated as high pre-mitigation, but can be reduced to a medium-low rating post-mitigation, mainly by reducing the extent, duration, reversibility and probability of the impact. The impact is unlikely to cause an irreplaceable loss of resources, and the cumulative impact is rated as medium. The final significance is therefore a medium-high rating. Mitigation measures are listed in Table 30.

#10: Increased risk of contamination (soil and water resource) from fuel spills, construction waste, and hazardous materials.

Pollutants spilling or leaking into the surrounding area will result in the loss of usable water resources, the loss of fauna and flora species and the associated habitat.

- Activities that will contribute to this impact:
  - Stormwater runoff from opencast areas; and
  - Pipeline leakages or damage.
- Cumulative Impacts
  - Loss of usable water resources for fauna species; and
  - Loss of viable habitat.
- Irreplaceable Loss of Resources

Irreplaceable loss of the following resources:

Loss of usable water resources for fauna species resulting in loss of indigenous species.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially and temporally. The significance rating for this impact was rated as medium-high pre-mitigation, but can be reduced to a medium-low rating post-mitigation, mainly by reducing the magnitude, reversibility and probability of the impact. The impact is likely to cause an irreplaceable loss of resources, but the value of these resources is limited, and the cumulative impact is rated as medium. The final significance is therefore a medium-low rating. Mitigation measures is included in Table 30.

#11: Introduction of alien species, especially plants

The spread of alien invasive species will result in the loss of habitat and water for indigenous fauna and flora. It can also contribute to the spreading of potentially dangerous diseases due to invasive - and pest species. Overall, the fauna assemblage will be changed.

- Activities that will contribute to this impact:
    - Vegetation removal and disturbance of soil;
    - Vehicles potentially spreading seed;
    - Unsanitary conditions surrounding infrastructure promoting the establishment of alien and/or invasive; and
    - Eating area increasing pest species such as rats and flies.
- Cumulative Impacts
    - Loss of habitat for indigenous species; and
    - Spread of disease to surrounding areas.
- Irreplaceable Loss of Resources

Irreplaceable loss of the following resources:

- Loss of CBA, ESA and NPAES areas.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially and temporally. The significance rating for this impact was rated as medium-high pre-mitigation, but can be reduced to a low rating post-mitigation, mainly by reducing the extent, duration magnitude, reversibility and probability of the impact. The impact is unlikely to cause an irreplaceable loss of resources, and the cumulative impact is rated as medium. The final significance is therefore a slightly higher low significance rating. Mitigation measures is included in Table 30.

8.3.1.4 LAND & SOIL DEGRADATION

#18: Increased bare surfaces, runoff and potential for erosion.

The clearing of vegetation will result in increased bare surfaces and runoff and this poses a risk for erosion and further loss of topsoil and habitat destruction.

- Activities that will contribute to this impact:
    - Storm water runoff from roads, and other paved areas;
    - Vehicles driving outside demarcated areas;
    - Footpaths outside demarcated areas;
    - Clearing of vegetation;
    - Water runoff from areas with bare soil; and
    - Compacting of roads.
- Cumulative Impacts
    - Removal of topsoil; and
    - Loss of habitat for indigenous species.
- Irreplaceable Loss of Resources

Irreplaceable loss of the following resources:

- Loss of CBA, ESA and NPAES areas.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially. The significance rating for this impact was rated as medium-low pre-mitigation, but can be reduced to a lower medium-low rating post-mitigation, mainly by reducing the extent, duration, reversibility and magnitude of the impact. The impact may result in the irreplaceable loss of resources, and the cumulative impact is rated as medium. The final significance is therefore a slightly higher medium-low rating. Mitigation measures are listed in Table 30.

8.3.1.5 WATER RESOURCES & POLLUTION

#19: Impacts on water quantity by abstraction boreholes (Pumping from production boreholes for dewatering) and through passive groundwater ingress.

According to the calibrated groundwater model, inflows to the expanded pit area (Area 3) are expected to increase to approximately 500 m^3/day. This projected rate is consistent with current inflow volumes measured in Area 1, which is presently under active mining, and therefore considered a realistic estimate. The model further indicates that the 5 m drawdown cone will not extend beyond 1 km from the pit boundary, primarily due to the low permeability of the surrounding noritic lithologies, which significantly limit lateral groundwater movement.

Importantly, the dewatering impact within the newly developed section will be mitigated by prior depressurisation and aquifer storage depletion resulting from ongoing mining in adjacent areas. As a result, the overall impact of additional mine dewatering on the regional aquifer system is assessed to be low in both magnitude and significance. Continued groundwater level monitoring in perimeter boreholes will ensure that drawdown predictions remain within the expected range and that any deviations can be promptly managed through adaptive abstraction control.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially and temporally. The significance rating for this impact was rated as medium-high pre-mitigation, but can be reduced to medium-low rating post-mitigation, mainly by reducing the extent, magnitude and probability of the impact. The impact may result in the irreplaceable loss of resources, but the value of these resources is limited and the cumulative impact is rated as medium. The final significance is therefore a slightly higher medium-low rating. Mitigation measures are listed in Table 30.

#21: Impacts on water quality captured by pit (Impact of Mine Water Contamination)

Groundwater and direct rainfall that enters the opencast workings will be pumped out as part of the dewatering; therefore, the impact on water quality will be minor. The opencast working will remain a sink operationally; therefore, contamination will be contained withing the open cast mine.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially and temporally. The significance rating for this impact was rated as medium-high pre-mitigation, but can be reduced to medium-low rating post-mitigation, mainly by reducing the extent, magnitude and probability of the impact. The impact may result in the irreplaceable loss of resources, but the value of these resources is limited and the cumulative impact is rated as medium. The final significance is therefore a slightly higher medium-low rating. Mitigation measures are listed in Table 30.

8.3.1.6 CULTURAL & HERITAGE IMPACTS

#23: Potential destruction of Late Iron Age (LIA) Archaeological sites

The LIA sites will be destroyed or disturbed by construction activities. Some LIA features, mostly walling sites, will be destroyed by the opencast mine. If the layout of the opencast area cannot be amended to avoid the impact, the mitigation hierarchy will be followed to lower the potential negative impact. Should the impact be avoided, the post-mitigation and final score will be low. If the impact cannot be avoided, the post-mitigation and final significance would still be low, but will have a slightly higher low significance score.

This will be a new impact specifically for the Area 3 expansion. The significance rating for this impact was rated as high pre-mitigation, but can be reduced to low post-mitigation, mainly by reducing the extent, magnitude and probability ratings of the impact. The impact may result in irreplaceable loss of resources of high value, and the cumulative impact is rated as low. The final significance is therefore a slightly higher score, but still falling into the low significance rating. Mitigation measures are listed in Table 30.

#24: Potential destruction of possible graves.

No discovered graves have been detected on the study area, Area 3 expansion area, but was discovered adjacent to the study area. Undiscovered graves may be destroyed or disturbed by construction activities. If graves are discovered during the construction phase and the impact cannot be avoided, the mitigation hierarchy will be followed to lower the potential negative impact.

This will be a new impact specifically for the Area 3 expansion. The significance rating for this impact was rated as high pre-mitigation, but can be reduced to low post-mitigation, mainly by reducing the extent, magnitude and probability ratings of the impact. The impact may result in irreplaceable loss of resources of high value, and the cumulative impact is rated as low. The final significance is therefore a slightly higher score, but still falling into the low significance rating. Mitigation measures are listed in Table 30.

#25: Potential destruction of historical kraal walling made from LIA walling.

The historical infrastructure may be destroyed or disturbed by construction activities. If the impact cannot be avoided, the mitigation hierarchy will be followed to lower the potential negative impact.

This will be a new impact specifically for the Area 3 expansion. The significance rating for this impact was rated as high pre-mitigation, but can be reduced to low post-mitigation, mainly by reducing the extent, magnitude and probability ratings of the impact. The impact may result in irreplaceable loss of resources of high value, and the cumulative impact is rated as low. The final significance is therefore a slightly higher score, but still falling into the low significance rating. Mitigation measures are listed in Table 30.

8.3.1.7 PALAEONTOLOGICAL RESOURCES

#26: Loss of Palaeontological Resources.

The proposed Rustenburg Chrome Mine Project in North-West Province is underlain by Mathlagame Norite-Anorthosite and Bronzitite, Harzburgite and Norite of the Rustenburg Layered Suite (Bushveld Complex). According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS) the Palaeontological Sensitivity of the Rustenburg Layered Suite (Bushveld Complex) is Zero (Almond and Pether, 2009; Almond *et al.,* 2013, Groenewald *et al*., 2014). The suggested location is classified as having a Medium Palaeontology Theme Sensitivity in the DFFE (Department of Forestry Fisheries and the Environment) Screening Report. Updated Geology (Council of Geosciences) refined the geological map and indicate that the proposed development is underlain by the Schilpadnest and Vlakfontein Subsuite (Rustenburg Layered Subsuite of the Bushveld Complex).

Desktop research (National Database and published data) concluded that fossil heritage of scientific and conservational interest in the development area is rare. A low significance has thus been allocated to the development footprint. This is in agreement with the Zero Palaeontological Sensitivity allocated to the development area by the SAHRIS Palaeontological Sensitivity Map.

A Low Palaeontological Significance has been allocated for impacts associated with the construction phase of the project pre-mitigation and post-mitigation. The construction phase will be the only development phase with the potential of impacting Palaeontological Heritage, and no significant impacts are expected during the closure phase. As the No-Go Alternative considers the option of 'do nothing' and maintaining the status quo, it will have a Neutral impact on the Palaeontological Heritage of the development. The Cumulative impacts of the project is considered to be Low (as the area is not highly fossiliferous), and falls within the acceptable limits for the project. The project is also unlikely to cause any irreplaceable loss of resources. The final significance is low.

It is therefore considered that the proposed project will not lead to damaging impacts on the palaeontological resources of the area. The project may thus be permitted in its whole extent, as the development footprint is

not considered sensitive in terms of palaeontological resources. It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required, pending the discovery of newly discovered fossils.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially.

8.3.2 OPERATIONAL PHASE IMPATCS

8.3.2.1 **AIR QUALITY**

Potential existing impacts on air quality was identified through documentation received from the applicant and the specialist baseline information on air quality (Airshed, 2025). Sources of emissions from the baseline include active ventilation shafts, materials handling points, crushing and screening, vehicle entrainment on unpaved roads, and windblown dust from the topsoil and ore stockpiles, TSF, WRD and existing opencast areas within RCM operation as well as from surrounding mining operations.

Existing sources of emissions near the study area include mining and processing activities, farming and residential land-uses that occur in the region. These land-uses contribute to baseline pollutant concentrations via vehicle tailpipe emissions, household fuel combustion, biomass burning and various fugitive dust sources. Long-range transport of particulates, emitted from remote tall stacks and from large-scale biomass burning in countries to the north of South Africa, has been found to contribute to background fine particulate concentrations within the South African boundary (Andreae, et al., 1996; Garstang, Tyson, Swap, & Edwards, 1996; Piketh, Annegarn, & Kneen, 1996).

Fugitive emissions from opencast and underground mining operations typically comprise of land clearing operations (i.e. scraping, dozing and excavating), materials handling operations (i.e. tipping, off-loading and loading, conveyor transfer points), vehicle entrainment from haul roads, wind erosion from open areas, drilling and blasting. These activities mainly result in particulates and dust emissions, with small amounts of oxides of nitrogen (NOx), carbon monoxide (CO), SO_2, methane and CO^2 being released during blasting operations.

Tharisa Chrome and Platinum mine is located approximately 5 km to the east of RCM's surface boundary with a dormant mine directly to the east. Samancor western chrome mine is roughly 8 km to the east. Further afield are Bleskop Mines, Kroondal Mine, and Rustenburg Platinum Mine. Anglo Platinum Smelter Operation (Waterval Smelter) and Impala Platinum are all located around Rustenburg, about 20 km to the west-northwest. Rhovan Vanadium is to the north of Brits and Vanchem to the east, both with associated mining operations. Most of the smelters have mining operations associated with it, with tailings storage facilities, unpaved roads and other materials handling activities generating dust.

Air pollution from vehicle emissions may be grouped into primary and secondary pollutants. Primary pollutants are those emitted directly into the atmosphere, and secondary, those pollutants formed in the atmosphere as a result of chemical reactions, such as hydrolysis, oxidation, or photochemical reactions. Notable primary pollutants emitted by vehicles include CO^2, CO, hydrocarbons (HCs), SO^2, NOx, DPM and Pb. Secondary pollutants include: NO_2, photochemical oxidants (e.g. ozone), HCs, sulphur acid, sulphates, nitric acid, nitric acid and nitrate aerosols. Hydrocarbons emitted include benzene, 1.2-butadiene, aldehydes and polycyclic aromatic hydrocarbons (PAH). Benzene represents an aromatic HC present in petrol, with 85% to 90% of benzene emissions emanating from the exhaust and the remainder from evaporative losses. Vehicle tailpipe emissions are localised sources and unlikely to impact far-field.

Both small and heavy private and industrial vehicles travelling along the N4 as well as the unpaved roads, are notable sources of vehicle tailpipe emissions.

#2: Air pollution as a result from dust generation activities (i.e. blasting, hauling, crushing, and stockpiling).

Additional air quality impacts that will result from the operation of the new infrastructure at the mine during the operational phase and from new opencast mining activities and areas will comprise mainly of land clearing operations (i.e. scraping, dozing and excavating), materials handling operations (i.e. tipping, off-loading and loading, conveyor transfer points), vehicle entrainment from haul roads, wind erosion from open areas, drilling

and blasting. These activities mainly result in particulates and dust emissions, with small amounts of oxides of nitrogen (NOx), carbon monoxide (CO), SO_2, methane and CO^2 being released during blasting operations.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially and temporally. The significance rating for this impact was rated as medium-high pre-mitigation, but can be reduced to a slightly lower medium-high post-mitigation, mainly by reducing the extent, magnitude and reversibility of the impact. The impact is likely to cause an irreplaceable loss of resources, however, these resources has a value that is limited, and the cumulative impact is rated as medium. The final significance is therefore a slightly lower than pre-mitigation significance, but slightly higher post-mitigation significance of medium-high. Mitigation measures are listed in Table 30.

#3: Air Quality as a result from gaseous emissions from vehicles and equipment

Additional air pollution from vehicle emissions during the operational phase may result. These may be grouped into primary and secondary pollutants. Primary pollutants are those emitted directly into the atmosphere, and secondary, those pollutants formed in the atmosphere as a result of chemical reactions, such as hydrolysis, oxidation, or photochemical reactions. Notable primary pollutants emitted by vehicles include CO^2, CO, hydrocarbons (HCs), SO_2, NOx, DPM and Pb. Secondary pollutants include: NO_2, photochemical oxidants (e.g. ozone), HCs, sulphur acid, sulphates, nitric acid, nitric acid and nitrate aerosols. Hydrocarbons emitted include benzene, 1.2-butadiene, aldehydes and polycyclic aromatic hydrocarbons (PAH). Benzene represents an aromatic HC present in petrol, with 85% to 90% of benzene emissions emanating from the exhaust and the remainder from evaporative losses. Vehicle tailpipe emissions are localised sources and unlikely to impact far-field.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially and temporally. The significance rating for this impact was rated as medium-high pre-mitigation, but can be reduced to medium-low post-mitigation, mainly by reducing the extent and magnitude of the impact. The impact is unlikely to cause an irreplaceable loss of resources and the cumulative impact is rated as medium. The final significance is therefore a slightly higher medium-low significance. Mitigation measures are listed in Table 30.

8.3.2.2 **NOISE & VIBRATION**

#5: Continuous low-frequency noise affecting local settlements and livestock.

Existing impacts from noise and vibration in and near the study area is mainly caused by insects, vehicles and mining machinery.

Additional noise and vibration impacts that will result from the operation of the vehicles associated at the mine and the extended mining activities, will involve vibration and noise from earth-moving equipment and vehicles for land clearing, blasting, hauling, crushing and drilling.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially and temporally. The significance rating for this impact was rated as medium-high pre-mitigation, but can be reduced to medium-low post-mitigation, mainly by reducing the magnitude and probability ratings of the impact. The impact is unlikely to cause an irreplaceable loss of resources and the cumulative impact is rated as medium. The final significance is therefore a slightly higher medium-low significance. Mitigation measures are listed in Table 30.

#6: Regular blasting leading to structural damage in nearby properties and disturbance to communities.

Additional or ongoing impacts leading to structural damage on nearby properties and disturbance to nearby communities will result from blasting.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially and temporally. The significance rating for this impact was rated as medium-high pre-mitigation, but can be reduced to medium-low post-mitigation, mainly by reducing the magnitude, probability and reversibility ratings of the impact. The impact is unlikely to cause an irreplaceable

loss of resources and the cumulative impact is rated as medium. The final significance is therefore a slightly higher medium-low significance. Mitigation measures are listed in Table 30.

8.3.2.3 **BIODIVERSITY**

It is anticipated that daily activities associated with the operation phase will lead to further spread of alien and invasive plants, as well as the deterioration of the habitats due to the increase of traffic, dust and edge effect impacts. Dust reduces the ability of plants to photosynthesise and thus leads to degradation/retrogression of the veld. Moving maintenance vehicles do not only cause sensory disturbances to fauna, affecting their life cycles and movement, but will lead to direct mortalities due to collisions, the roads and fences lead to the barrier effect reducing movement and dispersal. Environmental pollution due to water/ mine drainage runoff is also expected during this phase.

#12: Ongoing habitat destruction and disturbance to fauna from noise, dust, and artificial lighting

Through operation of the mine, more of the vegetation communities will be lost. Unmitigated, this will also lead to habitat fragmentation and the establishment of alien invasive species as well as soil erosion. Continued operations will result in disturbance to the faunal community through the production of noise, dust, artificial lightning, as well as other factors, such as direct mortality.

- Activities that will contribute to this impact:
    - Driving/ moving outside of designated areas;
    - Physical removal of vegetation and spread of AIPs;
    - Pollution (noise, light, dust, chemical, etc.);
    - Dumping of waste products; and
    - Direct persecution of wildlife.
- Cumulative Impacts
    - Further loss of EN vegetation type;
    - Loss of local wildlife.
- Irreplaceable Loss of Resources
    - Loss of EN vegetation type; and
    - Loss of CBA, ESA and NPAES areas.

Part of this impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially. The significance rating for this impact was rated as medium-high pre-mitigation, but can be reduced to medium-low post-mitigation, mainly by reducing the magnitude and probability ratings of the impact. The impact is unlikely to cause an irreplaceable loss of resources and the cumulative impact is rated as medium. The final significance is therefore only slightly higher than post-mitigation, but again falls in the medium-high category. Mitigation measures are listed in Table 30.

#13: Increased human-wildlife conflicts due to habitat fragmentation (litter, pollution, road mortalities, poaching, etc.)

Daily operation of the mine will result in increased risk of direct interactions between people and the local fauna community. This subsequently results in the increased risk of road mortalities, poaching and direct persecution. This may also increase of risk of harm to staff by wildlife through these interactions. It should be noted that the extension of the opencast area, will not increase this impact significantly.

- Activities that will contribute to this impact:
    - Driving around the around the opencast area;

- Poaching and setting of traps/placement of poisons;
- Dumping of waste products; and
- Direct persecution of wildlife due to fear and/or cultural beliefs.

- Cumulative Impacts
  - Loss of local wildlife.
- Irreplaceable Loss of Resources
  - Loss of local wildlife.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially and temporally. The significance rating for this impact was rated as medium-high pre-mitigation, but can be reduced to medium-low post-mitigation, mainly by reducing the magnitude, reversibility and probability ratings of the impact. The impact is unlikely to cause an irreplaceable loss of resources and the cumulative impact is rated as medium. The final significance is therefore only slightly higher medium-low significance than post-mitigation. Mitigation measures are listed in Table 30.

#14: Environmental pollution due to water/ mine drainage runoff

Pollutants spilling or leaking into the surrounding area will result in the loss of usable water resources, the loss of fauna and flora species and the associated habitat.

- Activities that will contribute to this impact:
  - Stormwater runoff from opencast areas; and
  - Pipeline leakages or damage.
- Cumulative Impacts
  - Loss of usable water resources for fauna species; and
  - Loss of viable habitat.
- Irreplaceable Loss of Resources

Loss of usable water resources for fauna species resulting in loss of indigenous species.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially and temporally. The significance rating for this impact was rated as medium-high pre-mitigation, but can be reduced to medium-low post-mitigation, mainly by reducing the extent, magnitude, reversibility and probability ratings of the impact. The impact is likely to cause an irreplaceable loss of resources, but the value of the resources is limited, and the cumulative impact is rated as medium. The final significance is therefore only slightly higher medium-low significance than post-mitigation. Mitigation measures are listed in Table 30.

8.3.2.4 LAND & SOIL DEGRADATION

#15: Continuous stripping of topsoil for opencast mining, leading to ongoing land degradation, including erosion

Ongoing opencast activities will result in the need to keep stripping topsoil. This will result in ongoing degradation of the surrounding habitats and increase the risk of erosion.

- Activities that will contribute to this impact:
  - Opencast mining activities;
  - Clearing of vegetation;

- Water runoff from areas with bare soil; and
- Compacting of roads.

- Cumulative Impacts:
  - Removal of topsoil; and
  - Loss of habitat for indigenous species.
- Irreplaceable Loss of Resources

Irreplaceable loss of the following resources:

- Loss of CBA, ESA and NPAES areas.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially and temporally. The significance rating for this impact was rated as medium-high pre-mitigation and can be reduced, but only to a medium-low post-mitigation, mainly by reducing the extent, magnitude, reversibility and probability ratings of the impact. The impact is unlikely to cause an irreplaceable loss of resources, and the cumulative impact is rated as medium. The final significance is therefore a slightly higher medium-high significance. Mitigation measures are listed in Table 30.

#16: Continued encroachment by alien and invasive plant species

The spread of alien invasive species will result in the loss of habitat and water for indigenous fauna and flora. Overall, the flora assemblage will be changed.

- Activities that will contribute to this impact:
  - Vehicles potentially spreading seed;
  - Unsanitary conditions during infrastructure removal promoting the establishment of alien and/or invasive;
  - Vehicles driving outside demarcated areas; and
  - Footpaths outside demarcated areas.
- Cumulative Impacts
  - Loss of habitat; and
  - Loss of indigenous flora species due to competition.
- Irreplaceable Loss of Resources
  - Loss of habitat and food sources for Fauna.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially and temporally. The significance rating for this impact was rated as high pre-mitigation and can be reduced to low post-mitigation, mainly by reducing the extent, duration, magnitude, reversibility as well as the probability ratings of the impact. The impact is unlikely to cause an irreplaceable loss of resources, and the cumulative impact is rated as medium. The final significance is therefore low. Mitigation measures are listed in Table 30.

8.3.2.5 WATER RESOURCES & POLLUTION

#20: Impacts on water quantity by abstraction boreholes (pumping from production boreholes for dewatering) and through passive groundwater ingress

According to the calibrated groundwater model, inflows to the expanded pit area (Area 3) are expected to increase to approximately 500 m^3/day. This projected rate is consistent with current inflow volumes measured

in Area 1, which is presently under active mining, and therefore considered a realistic estimate. The model further indicates that the 5 m drawdown cone will not extend beyond 1 km from the pit boundary, primarily due to the low permeability of the surrounding noritic lithologies, which significantly limit lateral groundwater movement.

Importantly, the dewatering impact within the newly developed section will be mitigated by prior depressurisation and aquifer storage depletion resulting from ongoing mining in adjacent areas. As a result, the overall impact of additional mine dewatering on the regional aquifer system is assessed to be low in both magnitude and significance. Continued groundwater level monitoring in perimeter boreholes will ensure that drawdown predictions remain within the expected range and that any deviations can be promptly managed through adaptive abstraction control. However, the new area and the current mining operations are located within a Strategic Water Source Area, and it is imperative that any loss from the system be prevented and mitigated as far as possible. The water extracted from the existing mining operations are currently pumped to PCDs and therefore water is lost from the catchment through evaporation. To prevent further loss water from the regional source, an alternative to pumping water to PCDs or open and or the backfilled pit is recommended. To pump water into the backfilled sections of the pit was assessed, but found to be not feasible, since the drainage of the area is such that the water will drain back to the open sections of the pit. Therefore, an outcomes based recommendation are made to include in the mitigation measures. The mine is to investigate alternative options of disposing dewatered water with the outcome of retaining as much water as possible within the catchment.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially and temporally. The significance rating for this impact was rated as medium-high pre-mitigation, but can be reduced to medium-low rating post-mitigation, mainly by reducing the extent, magnitude and probability of the impact. The impact may result in the irreplaceable loss of resources, but the value of these resources is limited and the cumulative impact is rated as medium. The final significance is therefore a slightly higher medium-low rating. Mitigation measures are listed in Table 30.

#22: Impacts on water quality captured by pit (Impact of Mine Water Contamination).

Groundwater and direct rainfall that enters the opencast workings will be pumped out as part of the dewatering; therefore, the impact on water quality will be minor. The opencast working will remain a sink operationally; therefore, contamination will be contained withing the open cast mine.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially and temporally. The significance rating for this impact was rated as medium-high pre-mitigation, but can be reduced to medium-low rating post-mitigation, mainly by reducing the extent, magnitude and probability of the impact. The impact may result in the irreplaceable loss of resources, but the value of these resources is limited and the cumulative impact is rated as medium. The final significance is therefore a slightly higher medium-low rating. Mitigation measures are listed in Table 30.

8.3.2.6 SOCIO-ECONOMIC IMPACTS

#27: Community Health & Safety: Risk of accidents related to mining activities and transport of hazardous materials.

Community health and safety can be significantly impacted by the risks associated with mining operations and the handling and transport of hazardous materials. The movement of heavy machinery, drilling, blasting, and the handling of toxic substances pose serious threats to employees and nearby communities. Accidents involving the spillage or leakage of hazardous materials during transport can contaminate local water sources and soil, leading to long-term health issues. Additionally, increased traffic from mining vehicles raises the risk of road accidents, especially in areas with limited infrastructure. These dangers highlight the need for stringent safety protocols, effective emergency response plans, and continuous community engagement to mitigate risks and protect public health.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially and temporally. The significance rating for this impact was rated

as medium-high pre-mitigation, but can be reduced to low post-mitigation, mainly by reducing the extent, magnitude, reversibility and probability ratings of the impact. The impact may result in irreplaceable loss of resources of high value, and the cumulative impact is rated as low. The final significance is therefore low. Mitigation measures are listed in Table 30.

#28: Job Continuation: Continuation of jobs at the mine if Life of Mine is extended and economic benefits for the surrounding communities.

The project will ensure job security for currently employed people, as they will be able to continue with their current jobs. This impact would be experienced on a wider level since it will allow them to meet the needs of their family members. This will be especially beneficial to retail and other service providers. The job continuation will be a significant positive impact during the operational phase, since the country is experience unusually high unemployment rates currently.

Apart from the direct economic impacts of the continued mining activities, there will also be secondary economic opportunities that can potentially continue to benefit local service providers. The use of local service providers will ensure that the local economy benefits directly from the continuation of mining. The positive impact of the mine on the local economy will continue for the life of the mine. The SLP also commits to secondary economic development in the area, and if it is implemented as planned should be a significant contribution.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended temporally. The significance rating for this impact was rated as high+ pre-mitigation and post-mitigation. The impact is highly likely to provide important economic resources for the local community and the cumulative impact is rated as high. The final significance is therefore an even higher significance rating. Measures to enhance this beneficial impact are listed in Table 30.

#29: Employment & Economic Contributions: Potential skills development and training programs for employees.

Continued employment and economic contributions are closely tied to the implementation of skills development and training programs for employees. These initiatives not only enhance the technical capabilities and safety awareness of the workforce but also foster long-term career growth and job stability. By continuing to investing in training, the mine can cultivate a pool of skilled workers who are better equipped to operate advanced machinery, manage environmental risks, and uphold regulatory standards. This, in turn, contributes to improved operational efficiency and productivity. Moreover, such programs can uplift surrounding communities by creating employment opportunities and stimulating local economies, reinforcing the mine's role as a driver of socio-economic development. The authorisation of the proposed activities will allow the mine to continue current programs and potentially initiate new training and skills development programs and projects.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended temporally. The significance rating for this impact was rated as high+ pre-mitigation and post-mitigation. The impact is likely to provide important economic resources for the local community and the cumulative impact is rated as medium. The final significance is therefore an even higher significance rating. Measures to enhance this beneficial impact are listed in Table 30.

#30: Livelihood & Land Use Conflicts: Reduced availability of arable land for farming due to mining expansion into southern areas.

The expansion of mining operations may lead to livelihood and land use conflicts, particularly due to the reduced availability of arable land for farming. This encroachment may disrupt agricultural activities that local communities rely on for food security and income. As fertile land is converted into mining zones, farmers may be forced to relocate or abandon their practices altogether, resulting in economic hardship and social tension. The loss of agricultural space also threatens local food systems and can increase dependency on external sources.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially and temporally. The significance rating for this impact was rated as medium-low pre-mitigation, but can be reduced to low post-mitigation, mainly by reducing the extent and

reversibility ratings of the impact. It is unlikely that the impact will result in irreplaceable loss of resources and the cumulative impact is rated as low. The final significance is therefore low. Mitigation measures are listed in Table 30.

#31: Livelihood & Land Use Conflicts: Competition for water resources between the mine and surrounding farmers.

The expansion of the mine may intensify competition for vital water resources, leading to livelihood and land use conflicts between mining operations and surrounding farming communities. As the mine scales up, its demand for water—used in mineral processing, dust suppression, and other industrial activities—can strain local supplies, reducing availability for agricultural use. This creates tension with farmers who rely on consistent water access for irrigation and livestock, threatening crop yields and food security. In regions where water is already scarce, such competition can escalate into disputes over rights, access, and environmental stewardship, undermining traditional land uses and destabilising economies.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially and temporally. The significance rating for this impact was rated as medium-high pre-mitigation, but can be reduced to low post-mitigation, mainly by reducing the extent, magnitude, reversibility and probability ratings of the impact. It is unlikely that the impact will result in irreplaceable loss of resources and the cumulative impact is rated as low. The final significance is therefore low. Mitigation measures are listed in Table 30.

8.3.3 REHABILITATION AND CLOSURE PHASE IMPACTS

8.3.3.1 LAND RESTORATION & VEGETATION RECOVERY

#17: Slow regrowth of natural vegetation and potential further spread of alien and invasive species.

If not implemented correctly, rehabilitation may not be successful, resulting in ongoing degradation of the natural habitats adjacent to the project site through the spread of alien and invasive vegetation, as well as stormwater runoff and erosion. Without the implementation of a rehabilitation plan, the project site will not recover to a natural state that is capable of supporting local fauna once more and contributing the functioning of ecosystem.

- Activities that will contribute to this impact:
    - Previously modified areas left bare;
    - Ongoing spread of alien and invasive plants; and
    - Illegal/irresponsible dumping of waste;
    - Newly vegetated areas left unfenced.
- Cumulative Impacts
    - Further loss of EN vegetation type;
    - Loss of local wildlife.
- Irreplaceable Loss of Resources
    - Loss of EN vegetation type; and
    - Loss of CBA, ESA and NPAES areas.

This impact is an extension of an existing impact i.e. this impact currently manifest in the mines current authorised activities, but is extended spatially. The significance rating for this impact was rated as medium-high pre-mitigation, but can be reduced to medium-low post-mitigation, mainly by reducing the duration, magnitude and probability ratings of the impact. It is unlikely that the impact may result in irreplaceable loss of resource

and the cumulative impact is rated as low. The final significance is therefore is therefore a medium-low significance rating. Mitigation measures are listed in Table 30.

8.3.3.2 JOB LOSSES & ECONOMIC DECLINE

#32 Retrenchments leading to social and economic hardship in local communities.

Following mine closure, retrenchments can trigger indirect social and economic hardship within local communities. The sudden loss of employment disrupts household incomes, leading to increased poverty, food insecurity, and reduced access to essential services like healthcare and education. Small businesses that relied on mine workers as customers may also collapse, deepening the economic downturn. Over time, these challenges can erode community cohesion, fuel migration in search of work, and strain local government resources tasked with managing the fallout.

This impact is an existing impact i.e. this impact currently manifest in the mines current authorised activities. The significance rating for this impact was rated as high pre-mitigation, but can be reduced to low post-mitigation, mainly by reducing the extent, magnitude, reversibility and probability ratings of the impact. The impact may result in irreplaceable loss of resource, but the value of the resources is limited, and the cumulative impact is rated as medium as it is probable that the impact will result in spatial and temporal cumulative change. The final significance is therefore is therefore a low significance rating, taking the prioritisation factors into account (replaceability and cumulative impacts). Mitigation measures are listed in Table 30.

8.3.3.3 ALTERNATIVE LAND USE OPPORTUNITIES

#33: Potential conversion of rehabilitated land for agriculture, conservation, or community use.

Following the closure of the mine, the successful rehabilitation of land presents a valuable opportunity for positive transformation. Once environmental restoration is complete—such as soil stabilization, re-vegetation, and water quality improvement—the land can be repurposed for productive agricultural use, supporting local food security and livelihoods. Alternatively, areas with restored ecosystems may be designated for conservation, enhancing biodiversity and creating green corridors that benefit wildlife and climate resilience. In some cases, the land can be converted into community assets like parks, educational centres, or recreational spaces, fostering social cohesion and long-term economic development. These adaptive reuses not only mitigate the legacy of mining but also empower surrounding communities with sustainable land-use options.

The significance rating for this impact was rated as low-medium+ pre-mitigation, but can be increased to a high+ post-mitigation significance, mainly by increasing the extent, duration, magnitude, reversibility and probability ratings of the impact. It is highly likely that this impact will result in high value resources and increase the value of resources, but the cumulative impact is rated as low. The final significance is, therefore, a higher high significance rating than post-mitigation, taking the prioritisation factors into account (replaceability and cumulative impacts). Measures to maximise the benefits of the impacts are listed in Table 30.

#34: Opportunities for eco-tourism or renewable energy projects.

After the closure of the mine, the rehabilitated land offers opportunities for eco-tourism and renewable energy development. Restored natural areas, such as revegetated zones, wetlands, and scenic open spaces, can be transformed into eco-tourism destinations that attract visitors for hiking, birdwatching, and educational tours, fostering environmental awareness and generating sustainable income for local communities. Simultaneously, the expansive, cleared land and existing infrastructure—such as roads and power connections—make ideal sites for renewable energy projects like solar farms or wind installations. These initiatives not only repurpose post-mining land for green innovation but also contribute to regional energy security aand climate resilience, turning a once-extractive site into a hub of sustainable progress.

The significance rating for this impact was rated as low-medium+ pre-mitigation, but can be increased to a high+ post-mitigation significance, mainly by increasing the extent, duration, magnitude, reversibility and probability ratings of the impact. It is highly likely that this impact will result in high value resources and increase the value of resources, but the cumulative impact is rated as low. The final significance is therefore is therefore a higher

high significance rating than post-mitigation, taking the prioritisation factors into account (replaceability and cumulative impacts). Measures to maximise the benefits of the impacts are listed in Table 30.

8.4 SUMMARY OF IMPACT ASSESSMENT RESULTS AND MITIGATION MEASURES

The table below contains a summary of the results of the impact assessment pre-and post-mitigation, as well as the final score and significance rating after calculating the cumulative impact and the irreplaceable loss rating. The table also contains a description of the mitigation measures included in the EMPr. The full impact assessment matrix can be found in Appendix G.

Table 30: Impact assessment summary and mitigation measures

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
1	Air pollution as a result from dust generation activities and gaseous emissions from vehicles and equipment.	Construction	Medium to high -	No additional measures are required for the impact, however, it is recommended that the current dust fall monitoring network be maintained and updated where required, and the monthly dust fall results used as indicators to tract the effectiveness of the applied mitigation measures. Dust fall collection should follow the ASTM method as per the NDCRs. The ASTM method covers the procedure of collection of dust fall and its measurement and employs a simple device consisting of a cylindrical container exposed for one calendar month (30 ±2 days).	Medium to low -
2	Air pollution as a result from dust generation activities (i.e. blasting, hauling, crushing, and stockpiling).	Operation	Medium to high -	No additional measures are required for the impact, however, it is recommended that the current dust fall monitoring network be maintained and updated where required, and the monthly dust fall results used as indicators to tract the effectiveness of the applied mitigation measures. Dust fall collection should follow the ASTM method as per the NDCRs. The ASTM method covers the procedure of collection of dust fall and its measurement and employs a simple device consisting of a cylindrical container exposed for one calendar month (30 ±2 days).	Medium to high -
3	Air Quality as a result from gaseous emissions from vehicles and equipment.	Operation	Medium to high -	No additional measures are required for the impact, however, it is recommended that the current dust fall monitoring network be maintained and updated where required, and the monthly dust fall results used as indicators to tract the effectiveness of the applied mitigation measures. Dust fall collection should follow the ASTM method as per the NDCRs. The ASTM method covers the procedure of collection of dust fall and its measurement and employs a simple device consisting of a cylindrical container exposed for one calendar month (30 ±2 days).	Medium to low -
4	Increased noise and vibrations from earth-moving equipment affecting nearby	Construction	Medium to high -	No additional measures are required for the impact, however, the noise and vibration / blasting monitoring plan should be amended and the network expanded to include the expanded open pit.	Low -

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
	communities and wildlife.				
5	Continuous low-frequency noise affecting local settlements and livestock.	Operation	Medium to high -	No additional measures are required for the impact, however, the noise and vibration / blasting monitoring plan should be amended and the network expanded to include the expanded open pit.	Medium to low -

6	Regular blasting leading to structural damage in nearby properties and disturbance to communities.	Operation	Medium to high -	This impact was not assessed in the original EIA/EMPr (2018) for opencast mining. The mitigation measures proposed for this impact are:
				• The Mandatory Code of Practice (COP) issued under the Mine Health and Safety Act (MHSA), which sets minimum standards should be implemented, minimum standards for the following should be included in the EMPr:
				  ○ Ground vibrations;
				  ○ Noise;
				  ○ Air-blast;
				  ○ Flyrock.
				• Blasting design and control can limit charge size per delay to reduce vibration intensity.
				• The use of electronic detonators for precise timing and reduced peak particle velocity could be implemented.
				• Increase stemming length in blast holes to contain explosive energy.
					Medium to low -

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
				• Apply buffer zones between blasting sites and sensitive structures, based on vibration modelling. • Install seismographs at strategic locations to monitor ground vibrations and air-blast levels. • Conduct United States Bureau of Mines (USBM) analysis to compare measured vibrations against safe thresholds. • Use predictive modelling to estimate vibration impacts before each blast. • Offer free structural surveys to all properties within a defined radius (e.g., 500 m to 1 km). • Document existing cracks and structural conditions using photos, videos, and written reports. • Restrict blasting to weekday daytime hours; avoid weekends and public holidays. • Provide advance notice to affected communities, including: Blasting times and dates. • Audible warning signals before detonation. • Establish a complaints and claims process for residents to report damage. • Maintain a log of blasting events, including vibration readings and community feedback. • Implement dust suppression and fume control measures. • Monitor and mitigate fly rock risks using blast mats or containment barriers.	

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
				• Ensure compliance with air-blast noise limits to prevent hearing damage and structural stress. • Conduct regular community meetings to share monitoring results and address concerns. • Include local representatives in the environmental oversight committee. • Provide transparent access to blasting data and mitigation reports.	
7	Destruction, loss and fragmentation of the vegetation community and potential Species of Conservation Concern.	Construction	High -	• All mitigation measures in the EMPr relevant to clearing of vegetation should be implemented. In addition, the following is required specifically for Area 3: • Management Outcomes: o Prevent the further loss and fragmentation of indigenous vegetation communities within the ecosystem in the vicinity of the PAOI; o Reduce the negative fragmentation effects of the development and enable the safe movement of fauna species; o Prevent the direct and indirect loss and disturbance of flora and fauna species and communities, including the negative effects associated with the introduction and proliferation of alien and invasive species; and o Adequately follow the guidelines for interpreting the Site Ecological Importance ratings assigned to the PAOI. o Prevent and Control spread of Alien Species.	Medium to low -

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
				○ Enhance the remaining EN vegetation type to the north and north-west of the study area. Management Actions: ○ A site walkdown and a protected flora walkdown must be conducted during the correct flowering season (between October and March following sufficient rainfall to prompt flowering) prior to the commencement of development activities and all protected flora species must be avoided or the relevant permits must be obtained for activities which may result in the need to translocate, cut/damage, and/or destroy specimens. ○ Pursue options to improve on the remaining EN vegetation types to the north and north-west of the study area falling within the CBA 2 area, by engaging with the landowner/s with the goal of developing and implementing a biodiversity management plan by a registered and qualified ecologist. This plan should include as a minimum active rehabilitation measures and bi-annual alien invasive control and monitoring, as well as annual audits of the plan. ○ It is recommended that areas to be developed/disturbed be specifically demarcated so that during the construction/activity phase, only the demarcated areas be impacted upon. ○ Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should not be fragmented or disturbed further if possible.	

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
				○ All vehicles and personnel must make use of existing roads and walking paths as far as possible, especially construction/operational vehicles. ○ The clearing of vegetation must be minimised where possible. All activities must be restricted to within the authorised areas. ○ Materials may not be stored for extended periods of time and must be removed from the PAOI once the construction phase has been concluded. No permanent construction phase structures should be permitted. Construction buildings should preferably be prefabricated or constructed of re-usable/recyclable materials. No storage of vehicles or equipment will be allowed outside of the designated laydown areas. ○ Areas that are denuded during construction need to be re-vegetated with indigenous vegetation according to a habitat rehabilitation plan, to prevent erosion during flood and wind events and to promote the regeneration of functional habitat. This will also reduce the likelihood of encroachment by alien invasive plant species. All grazing mammals must be kept out of the areas that have recently been re-planted. ○ A habitat rehabilitation plan must be implemented, and areas of bare ground must be revegetated with species indigenous to the region. ○ A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. The water resources must to be	

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
				protected and all activities that could result in a spill should occur away from them. o Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. o No servicing of equipment on site unless necessary. o All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. o Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them from leaking and entering the environment. o Construction activities and vehicles could cause spillages of lubricants, fuels and waste material negatively affecting the functioning of the ecosystem. o All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the PAOI. o It must be made an offence for any staff member to remove any indigenous plant species from the PAOI or bring any alien species in. This is to prevent the spread of exotic or alien species or the illegal collection of plants. o All construction waste must be removed from site at the closure of the construction phase.	

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
				○ An Alien Invasive Plant (AIP) Management Plan must be compiled and implemented. This should regularly be updated to reflect the annual changed in AIP composition. ○ The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprints of the roads must be kept to prescribed widths. ○ A pest control plan must be put in place and implemented; it is imperative that poisons not be used to control pests. ○ Update Environmental Awareness Training Programme with the following: ▪ All personnel and contractors are to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. ▪ Discussions are required on sensitive environmental receptors within the PAOI in line with the Environmental Authorisation and within the EMPr. ▪ Contractors and employees must all undergo the induction and must be made aware of any sensitive areas to be avoided.	
8	Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road	Construction	Medium to high -	• A site walk through must be performed by a suitably qualified ecologist prior to any activities taking place and any SSC or protected species should be noted. In situations where these species are observed and must be removed, the proponent may only do so after the required permission/permits have been obtained in accordance with national and provincial legislation. In the abovementioned situation the development	Medium to low -

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
	collisions, noise, light, dust, vibration and poaching) and potential loss of Species of Conservation Concern.			and implementation of a search, rescue and recovery program is suggested for the protection of these species. Should animals not move out of the area on their own, relevant specialists must be contacted to advise on how the species can be relocated. • Clearing and disturbance activities must be conducted in a progressive linear manner, always outwards and away from the centre of the PAOI and over several days, so as to provide an easy escape route for all small mammals and herpetofauna. • The areas to be disturbed must be specifically and responsibly demarcated to prevent the movement of staff or any individual into the surrounding environments, signs must be put up to enforce this. • The duration of the activities should be minimised to as short a term as possible, to reduce the period of disturbance on fauna. • Noise must be kept to an absolute minimum during the evenings and at night to minimise all possible disturbances to reptile species and nocturnal mammals. • No trapping, killing, or poisoning of any wildlife is to be allowed and signs must be put up to enforce this. Monitoring must take place in this regard. • Outside lighting should be designed and limited to minimise impacts on fauna. All outside lighting should be directed away from any sensitive areas. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible. • All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to	

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
				comply with speed limits, to respect all forms of wildlife. Speed limits must be enforced to ensure that road killings and erosion is limited. • Schedule activities and operations during least sensitive periods, to avoid migration, nesting, and breeding seasons. In this case, activities should take place during the day. • Any holes/deep excavations must be dug in a progressive manner and should not be left open overnight. Should any holes remain open overnight they must be properly covered temporarily to ensure that no small fauna species fall in. Holes must be subsequently inspected for fauna prior to backfilling. • If fencing is required: wildlife-permeable fencing with holes large enough for mongoose and other smaller mammals should be installed, the holes must not be placed in the fence where it is next to a major road as this will increase road killings in the area. • A pest control plan must be put in place and implemented; it is imperative that poisons not be used to control pests.	
9	Clearing of vegetation leading to soil erosion and loss of topsoil.	Construction	High -	• In addition to all the existing mitigation measures in the EMPr, the following is recommended to be implemented for Area 3: ○ Speed limits must be put in place to reduce erosion. Soil surfaces must be wetted as necessary to reduce the dust generated by the project activities. Speed bumps and signs must be erected to enforce slow speeds. ○ Only existing access routes and walking paths may be made use of. All new roads must be authorised.	Medium to high -

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
				○ Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events etc. ○ A stormwater management plan must be compiled and implemented, or amended, if existing to include Area 3.	
10	Increased risk of contamination (soil and water resource) from fuel spills, construction waste, and hazardous materials.	Construction	Medium to high -	All the existing mitigation measures in the EMPr for the opencast areas, also to be implemented for Area 3. No additional measures required.	Medium to low -
11	Introduction of alien species, especially plants.	Construction	Medium to high -	All mitigation measures in the EMPr relevant to alien vegetation should be implemented. In addition, the following is required specifically for Area 3: • Management Outcome: ○ Prevent and Control spread of Alien Species. • Management Actions: ○ An Alien Invasive Plant (AIP) Management Plan must be compiled and implemented. This should regularly be updated to reflect the annual changed in AIP composition. ○ A pest control plan must be put in place and implemented; it is imperative that poisons not be used to control pests.	Low -
12	Ongoing habitat destruction and	Operation	Medium to high -	All existing approved mitigation measures in the current EMPr and in this addendum related to noise, dust and artificial lighting, to be implemented for Area 3.	Medium to high -

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
	disturbance to fauna from noise, dust, and artificial lighting.				
13	Increased human-wildlife conflicts due to habitat fragmentation (litter, pollution, road mortalities, poaching, etc.).	Operation	Medium to high -	All existing approved mitigation measures in the current EMPr and in this addendum related to noise, dust and artificial lighting, waste management, etc. to be implemented for Area 3. In addition the following should also be implemented for Area 3: • Waste management must be a priority and all waste must be collected and stored effectively and responsibly according to a site-specific waste management plan. Dangerous waste such as metal wires and glass must only be stored in fully sealed and secure containers, before being moved off site as soon as possible. • Litter, spills, fuels, chemical and human waste in and around the PAOI must be minimised and controlled according to the waste management plan. • Cement mixing may not be performed on the ground. It is recommended that only closed side drum or pan type concrete mixers be utilised. Any spills must be immediately contained and isolated from the natural environment, before being removed from site. • Toilets at the recommended Health and Safety standards must be provided. These should be emptied regularly and once no longer required, they must be pumped dry to prevent leakage into the surrounding environment and removed from site. • The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility within every 10 days at least.	Medium to low -

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
				• Where a registered disposal facility is not available close to the PAOI, the Contractor shall provide a method statement with regards to waste management. Under no circumstances may domestic waste be burned on site or buried on open pits. • Refuse bins will be responsibly emptied and secured. Temporary storage of domestic waste shall be in covered and secured waste skips. Maximum domestic waste storage period will be 10 days.	
14	Environmental pollution due to water/ mine drainage runoff.	Operation	Medium to high -	All the existing mitigation measures in the EMPr for the opencast areas, also to be implemented for Area 3. No additional measures required, except, a stormwater management plan must be compiled and implemented, or amended, if existing to include Area 3. This plan to include the development and maintenance of clean and dirty stormwater channels, where required.	Medium to low -
15	Continuous stripping of topsoil for opencast mining, leading to ongoing land degradation, including erosion.	Operation	Medium to high -	All the existing mitigation measures in the EMPr for the opencast areas, also to be implemented for Area 3. No additional measures required, other than the mitigation measures already provided in this EMPr for similar impacts (refer to Impact #9, 10 and 11 of this table). All existing approved mitigation measures in the current EMPr and in this addendum related to erosion and stripping of topsoil, to be implemented for Area 3.	Medium to low -
16	Continued encroachment by alien and invasive plant species	Operation	High -	All mitigation measures in the EMPr relevant to alien vegetation should be implemented. In addition, the following is required specifically for Area 3: • Management Outcome: ○ Prevent and Control spread of Alien Species. • Management Actions:	Low -

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
				○ An Alien Invasive Plant (AIP) Management Plan must be compiled and implemented. This should regularly be updated to reflect the annual changed in AIP composition. ○ A pest control plan must be put in place and implemented; it is imperative that poisons not be used to control pests.	
17	Slow regrowth of natural vegetation and potential further spread of alien and invasive species.	Rehab and Closure	Medium to high -	All mitigation measures in the EMPr relevant to alien vegetation should be implemented. In addition, the following is required specifically for Area 3: • Management Outcome: ○ Prevent and Control spread of Alien Species. • Management Actions: ○ An Alien Invasive Plant (AIP) Management Plan must be compiled and implemented. This should regularly be updated to reflect the annual changed in AIP composition. ○ A pest control plan must be put in place and implemented; it is imperative that poisons not be used to control pests. ○ A habitat rehabilitation plan must be implemented, and areas of bare ground must be revegetated with species indigenous to the region.	Medium to low -
18	Increased bare surfaces, runoff and potential for erosion.	Construction	Medium to low -	• All the existing mitigation measures in the EMPr for the opencast areas, also to be implemented for Area 3. • A stormwater management plan must be compiled and implemented, or amended, if existing to include Area 3. This plan to include prevention of potential for erosion.	Medium to low -

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
				• Speed limits must be put in place to reduce erosion. Soil surfaces must be wetted as necessary to reduce the dust generated by the project activities. Speed bumps and signs must be erected to enforce slow speeds. • Only existing access routes and walking paths may be made use of. All new roads must be authorised. • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events etc.	
19	Impacts on water quantity by abstraction boreholes (pumping from production boreholes for dewatering) and through passive groundwater ingress.	Construction	Medium to high -	• Area 3 is expected to be the deepest section of the opencast development and will ultimately serve as the access point into the underground. Given this, it is critical that the current flooded level within the surrounding underground workings is confirmed prior to mining progresses into that zone. This will ensure that inflow risks are properly understood, and that the necessary safeguards can be put in place ahead of time. • In addition, the drilling of two dedicated monitoring boreholes one upstream and one downstream of Area 3 is recommended prior to commencement of mining. These will assist in: o Identifying any geological structures or preferential pathways intersecting the pit that could link to other water-bearing zones, whether from adjacent flooded workings or natural aquifers o Confirming whether any connected water sources exist that could influence pit stability with underground workings, dewatering demand, or long-term water quality. o Providing baseline and ongoing data to manage potential pollution risks associated with both open pit and underground activities.	Medium to low -

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
				• 24-hour aquifer testing of boreholes to determine the aquifer parameters for the aquifer for the model to be updated; • Monitoring of abstraction volumes in pit sumps and monitoring boreholes water levels to ensure impacts are managed; • Quarterly monitoring of groundwater levels. • Monitoring of abstraction volumes of pit and monitoring boreholes water levels to ensure abstraction rates are sustainable and managed. • Stormwater management will be in place to mitigate the risk to groundwater and run off from rainwater into pit. • To finalize these mitigation measures and integrate them properly into the mine's water management strategy, the geohydrologist also requires updated and more detailed mining plans for both Area 3 and the future long term planned underground and the open pit phases, particularly around the planned interface points.	
20	Impacts on water quantity by abstraction boreholes. (Pumping from production boreholes) and through passive groundwater ingress	Operation	Medium to high -	• Area 3 is expected to be the deepest section of the opencast development and will ultimately serve as the access point into the underground. Given this, it is critical that the current flooded level within the surrounding underground workings is confirmed prior to mining progresses into that zone. This will ensure that inflow risks are properly understood, and that the necessary safeguards can be put in place ahead of time. • In addition, the drilling of two dedicated monitoring boreholes one upstream and one downstream of Area 3 is recommended prior to commencement of mining. These will assist in:	Medium to low -

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
				○ Identifying any geological structures or preferential pathways intersecting the pit that could link to other water-bearing zones, whether from adjacent flooded workings or natural aquifers ○ Confirming whether any connected water sources exist that could influence pit stability with underground workings, dewatering demand, or long-term water quality. ○ Providing baseline and ongoing data to manage potential pollution risks associated with both open pit and underground activities. • 24-hour aquifer testing of boreholes to determine the aquifer parameters for the aquifer for the model to be updated; • Monitoring of abstraction volumes in pit sumps and monitoring boreholes water levels to ensure impacts are managed; • Quarterly monitoring of groundwater levels. • Monitoring of abstraction volumes of pit and monitoring boreholes water levels to ensure abstraction rates are sustainable and managed. • Stormwater management will be in place to mitigate the risk to groundwater and run off from rainwater into pit. • To finalize these mitigation measures and integrate them properly into the mine's water management strategy, the geohydrologist also requires updated and more detailed mining plans for both Area 3 and the future long term planned underground and the open pit phases, particularly around the planned interface points.	

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
21	Impacts on water quality captured by pit	Construction	Medium to high -	• Currently there are no groundwater monitoring boreholes at the pit areas. Geophysical surveys need to be conducted on site and around the facility to determine the placement of monitoring boreholes in an upgradient position, on-site and down gradient position of the pit areas. • Monthly Monitoring of boreholes drilled, water quality to be recorded to make sure the impact is monitored and managed. • Stormwater management will be in place to mitigate the risk to groundwater and run off from rainwater into pit.	Medium to low -
22	Impacts on water quality captured by pit	Operation	Medium to high -	• Currently there are no groundwater monitoring boreholes at the pit areas. Geophysical surveys need to be conducted on site and around the facility to determine the placement of monitoring boreholes in an upgradient position, on-site and down gradient position of the pit areas. • Monthly Monitoring of boreholes drilled, water quality to be recorded to make sure the impact is monitored and managed. • Stormwater management will be in place to mitigate the risk to groundwater and run off from rainwater into pit.	Medium to low -
23	Potential destruction of Late Iron Age Archaeological sites	Construction	High -	• Implement a chance to find procedures in case where possible heritage finds are uncovered. • The LIA site complex as indicated must be retained with a 50 m buffer or a Phase II mitigation process must be enacted. Here isolated sites will not be analysed but instead the entire site complex. Archaeological mitigation permits will be applied for under SAHRA and only after the Phase II report was submitted can destruction permits be applied for. Destruction permits for all the discovered features within the Area 3 and a 50m buffer, need to be obtained prior to commencing with the activity. Refer to Figure 54 for	Low -

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
				the locations of these features. These include: Ex 04, Ex 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29. 30, 31, 32, 33, 34, Ft/005, Ft/006. • Additionally, monitoring during site clearing in a 50 m radius from the identified archaeological LIA site complex through the implementing of an archaeological watching brief.	
24	Potential destruction of possible graves	Construction	High -	• Possible BGG Ex34, should be retained and avoided with a buffer zone of 50 m as per SAHRA guidelines. If this is not possible, the graves could be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of section 36 of the NHRA and its regulations as well as the National Health Act (Act 61 of 2003) (NHA) and its regulations. (Refer to Figure 54 for the location and buffer zone of this site). The study area does not fall within the 50 m buffer of the site. Care should be taken, however, not to encroach into the buffer area. This is a no-go area, if Phase II mitigation will not be pursued. • If the structures are to be altered or demolished it will require a permit from the North West Provincial Heritage Resources Authority (PHRA) in accordance with section 34 of the NHRA. • If graves are discovered, the graves could be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of Section 36 of the NHRA and its regulations as well as the NHA and its regulations.	Low -
25	Potential destruction of historical kraal walling made from LIA walling.	Construction	High -	• Implement a chance to find procedures in case where possible heritage finds are uncovered.	Low -

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
				• The LIA site complex as indicated must be retained with a 50 m buffer or a Phase II mitigation process must be enacted. Here isolated sites will not be analysed but instead the entire site complex. Archaeological mitigation permits will be applied for under SAHRA and only after the Phase II report was submitted can destruction permits be applied for. Destruction permits for all the discovered features within the Area 3 and a 50m buffer, need to be obtained prior to commencing with the activity. Refer to Figure 54 for the locations of these features. These include: Ex 04, Ex 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29. 30, 31, 32, 33, 34, Ft/005, Ft/006. • Additionally, monitoring during site clearing in a 50 m radius from the identified archaeological LIA site complex through the implementing of an archaeological watching brief.	
26	Loss of Palaeontological Resources.	Construction	Low -	• If fossil remains or trace fossils are discovered during any phase of construction, either on the surface or exposed by excavations the ECO or Environmental Manager in charge of these developments must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation can be carried out by a palaeontologist.	Low -
27	Risk of accidents related to mining activities and transport of hazardous materials.	Operation	Medium to high -	• The existing mitigation measures in the existing approved EMPr to be implemented and all the health and safety procedures and protocols to be followed. • No additional mitigation measures.	Low -

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
28	Continuation of jobs at the mine if Life of Mine is extended and economic benefits for the surrounding communities.	Operation	High +	• Ensure the project is approved and sustainably managed by implementing all the mitigation measures and recommendations of the specialists and EAP. • No additional measures.	Very high +
29	Potential skills development and training programs for employees.	Operation	High +	• Implement existing and approved programs at the mine. • No measures.	High +
30	Reduced availability of arable land for farming due to mining expansion into southern areas.	Operation	Medium to low -	• Addressing these conflicts requires inclusive land-use planning, stakeholder engagement, and the development of alternative livelihood programs to support affected communities.	Low -
31	Competition for water resources between the mine and surrounding farmers.	Operation	Medium to high -	• Addressing these conflicts requires inclusive land-use planning, stakeholder engagement, and the development of alternative livelihood programs to support affected communities.	Low -
32	Retrenchments leading to social and economic hardship in local communities.	Rehab and Closure	High -	Include measures in the SLP to ensure the transition period when the mine is approaching closure, plan (including financially) for alternative land uses and employment opportunities well in advance of closure of the mine.	Low -

No	Impact	Phase	Pre-Mitigation Significance	Mitigation Measures	Final Significance
33	Potential conversion of rehabilitated land for agriculture, conservation, or community use.	Rehab and Closure	Low to medium +	Include measures in the SLP to ensure the transition period when the mine is approaching closure, plan (including financially) for alternative land uses and employment opportunities well in advance of closure of the mine.	High +
34	Opportunities for eco-tourism or renewable energy projects.	Rehab and Closure	Low to medium +	Include measures in the SLP to ensure the transition period when the mine is approaching closure, plan (including financially) for alternative land uses and employment opportunities well in advance of closure of the mine.	High +

8.5 SUMMARY OF SPECIALIST REPORTS

Various specialists that were appointed to undertake the specialist assessments for the application area. Table 31 presents a summary of the findings and recommendations as identified in the specialist studies undertaken to inform the BAR.

The following specialist studies were undertaken:

- Groundwater Assessment – Hydrogreek Consulting.
- Terrestrial and Aquatic Biodiversity, Plant and Animal Species and Soils and Agricultural Potential Compliance Statements – The Biodiversity Company.
- Cultural and Archaeological Heritage Impact Assessment – PGS Heritage.

Table 31: Summary of Specialist Findings

Specialist study undertaken	Recommendations and Conclusion of Specialist Report	Reference to the applicable section of the Report where Specialist recommendations have been included.
Groundwater Assessment	The current impacts from the surrounding infrastructure were assessed to have already impacted the groundwater environment is terms of quality and quantity. The additional Area 3 opencast will not have a higher impact on the current groundwater environment. Therefore, the current and future impacts can be contained through the proposed mitigations. The potential environmental impacts associated with the proposed new infrastructure—such as the Area Opencast Area 3 expansion have been reviewed in the context of the existing operations assessed. Based on the nature, location, and function of the planned infrastructure, the associated impacts are anticipated to be materially similar in type, extent, and significance to those already identified and assessed. *Impacts during the Construction and Operational Phases:* • Impact of Mine Dewatering: According to the calibrated groundwater model, inflows to the expanded pit area (Area 3) are expected to increase to approximately 500 m^3/day. This projected rate is consistent with current inflow volumes measured in Area 1, which is presently under active mining, and therefore considered a realistic estimate. The model further indicates that the 5 m drawdown cone will not extend beyond 1 km from the pit boundary, primarily due to the low permeability of the surrounding noritic lithologies, which significantly limit lateral groundwater movement. • Impact of Mine Water Contamination: Groundwater quality that enters the opencast workings will be pumped out as part of the dewatering; therefore, the	**Section 8**

Specialist study undertaken	Recommendations and Conclusion of Specialist Report	Reference to the applicable section of the Report where Specialist recommendations have been included.
	impact will be minor. The opencast working will remain a sink operationally; therefore, contamination will be contained withing the open cast mine. *Impacts during the Closure and Post Closure Phases:* Although limited information exists in order to determine the closure impact of the open cast area, the geohydrologist is of the opinion, in their experience at dealing with similar mining operations in the area, that decant is highly unlikely due to the high evaporation rates (2000 mm/a) that exists and low groundwater ingress areas. The rewatering of these pits usually does not reach decant elevations and acts as a sink for over 100 years. Importantly, the dewatering impact within the newly developed section will be mitigated by prior depressurisation and aquifer storage depletion resulting from ongoing mining in adjacent areas. As a result, the overall impact of additional mine dewatering on the regional aquifer system is assessed to be low in both magnitude and significance. Continued groundwater level monitoring in perimeter boreholes will ensure that drawdown predictions remain within the expected range and that any deviations can be promptly managed through adaptive abstraction control. *Specialist opinion:* The potential environmental impacts associated with the proposed new expansion—such as the Area 3—have been reviewed in the context of the existing operations currently being assessed. Based on the nature, location, and function of the planned infrastructure, the associated impacts are anticipated to be materially similar in type, extent, and significance to those already identified and assessed. However, since limited information exists in determining the impact for the closure and post-closure phases and the impact from underground mining, various recommendations for determining, mitigating, managing and monitoring of the impacts and risks are provided below. The project is considered viable from a groundwater perspective, provided that the recommended mitigation measures and supporting studies are implemented to better define water availability, aquifer parameters and quality on site. The associated risks can be effectively managed through the existing approved and new recommended measures below.	

Specialist study undertaken	Recommendations and Conclusion of Specialist Report	Reference to the applicable section of the Report where Specialist recommendations have been included.
	Area 3 is expected to be the deepest section of the opencast development and will ultimately serve as the access point into the underground. Given this, it is critical that the current flooded level within the surrounding underground workings is confirmed prior to mining progresses into that zone. This will ensure that inflow risks are properly understood, and that the necessary safeguards can be put in place ahead of time. In addition, the drilling of two dedicated monitoring boreholes one upstream and one downstream of Area 3 prior to commencing with the expansion is recommended. These will assist in: • Identifying any geological structures or preferential pathways intersecting the pit that could link to other water-bearing zones, whether from adjacent flooded workings or natural aquifers • Confirming whether any connected water sources exist that could influence pit stability with underground workings, dewatering demand, or long-term water quality. • Providing baseline and ongoing data to manage potential pollution risks associated with both open pit and underground activities. • To finalize these mitigation measures and integrate them properly into the mine's water management strategy, the geohydrologist also requires updated and more detailed mining plans for both Area 3 and the future long term planned underground and the open pit phases, particularly around the planned interface points.	
Terrestrial and Aquatic Biodiversity, Plant and Animal Species and Soils and Agricultural Potential Compliance Statements – The Biodiversity Company.	**Conclusion** The PAOI exists in a severely degraded state owing to the active mining operations occurring in the area, as well as the surrounding agricultural practices. The natural habitats within the PAOI experience severe and ongoing anthropogenic disturbance which has resulted in their inability to recover to a more functional state. As a result, much of the functionality has been lost and without active human intervention and rehabilitation, these habitats will continue to degrade and are unlikely to recover. Due to the degradation, modification and the fragmented state and small size of the habitats, they do not provide suitable habitat for fauna or flora SCC. It is unlikely that	**Section 5.2**

Specialist study undertaken	Recommendations and Conclusion of Specialist Report	Reference to the applicable section of the Report where Specialist recommendations have been included.
	any of these habitats are representative of a CBA, and many of the areas classified as an ESA have already been modified. The Degraded Thornveld habitat is assigned a 'Low' sensitivity and the Modified habitat a 'Very Low' sensitivity. Based on the site verification, no wetlands, drainage lines, or natural aquatic features occur within or adjacent to the development footprint. The area is highly modified and of *low aquatic biodiversity sensitivity*; therefore, no further functional or impact assessment is required in accordance with the Aquatic Biodiversity Protocol (GN 320 of 20 March 2020). The baseline soil findings, current land uses and the calculated land potential dispute the agricultural theme in areas associated with sensitivities ranging from "Very Low to Low", "Low-Moderate" and "Moderate" land capability sensitivities within the project area. They further concur to an extent with "Very Low to Low" and "Low-Moderate" land capability sensitive within the 50 m buffer area of the proposed development. The overall site sensitivity of the project area ranges from 'Low' to 'Medium'. The ecological integrity, importance and functioning of these terrestrial biodiversity areas are at risk. The rehabilitation and preservation of these systems is the most important aspect to consider for the proposed project. **Impact Statement** The location, state and size of the ecosystem suggests that it is unlikely that any functional habitat or SCCs will be lost as a result of the impacts arising from the proposed activities. **Specialist Opinion** It is the opinion of the specialist that the proposed development is favorable only if all mitigation measures provided in this and other specialist reports are implemented, as well as the following: • An alien invasion plant (AIP) management plan must be compiled and implemented for the entire PAOI; • A rehabilitation plan must be compiled and implemented for the entire PAOI; • A dust management plan must be compiled and implemented for the entire PAOI; and	

Specialist study undertaken	Recommendations and Conclusion of Specialist Report	Reference to the applicable section of the Report where Specialist recommendations have been included.
	• A site walkdown and a protected flora walkdown must be conducted during the correct flowering season (between October and March following sufficient rainfall to prompt flowering) prior to the commencement of development activities and all protected flora species must be avoided or the relevant permits must be obtained for activities which may result in the need to translocate, cut/damage, and/or destroy specimens.	
Heritage Impact Assessment (HIA)	**Summary of Results:** The HIA identified various heritage resources within the study area including archaeological resources which are rated as having a high heritage significance and will require further mitigation work before the project can continue. It should be noted that the study was conducted for a larger area of which Area 3 was a part of. The study identified heritage resources, mostly forming part of a larger LIA occupation of the koppie and consist of both varying density pottery scatters graded as IIIB/IIIC to NCW and LIA walling graded as IIIB. Previous studies in the footprint have also identified various other heritage resources including: 2 cemeteries/graveyards, historical infrastructure, a historical homestead, a past community settlement, an ungraded heritage site, Middle Stone Age (MSA) stone tool scatters and further LIA occupation of the koppie located adjacent the study area. Desktop analysis further highlighted the greater extent of LIA walling around the koppie and fieldwork has indicated that further LIA walling is present at/near the koppie despite not being visible on satellite imagery (within Area 3). During the impact assessment phase, the heritage data collected during the fieldwork was evaluated according to the heritage significance methodology and impact assessment methodology provided by EIMS to determine the potential impacts of the proposed layout on the heritage resources. **Recommendations:** Mitigation and management measures were provided. These recommendations must be incorporated into the Environmental Management Programme (EMPr) for approval by the competent authority.	**Section 7**

Specialist study undertaken	Recommendations and Conclusion of Specialist Report	Reference to the applicable section of the Report where Specialist recommendations have been included.
	Conclusion It is the combined considered opinion of the heritage specialists that the proposed project will have a direct impact on several identified heritage resources rated being of low to high heritage significance. With the implementation of recommended mitigation measures the overall impact on heritage resources will be reduced to acceptable levels during the activities of the project.	

9 ENVIRONMENTAL IMPACT STATEMENT

9.1 SUMMARY OF KEY FINDINGS

A summary of the key findings of the environmental impact assessment as undertaken in this BAR is outlined below:

- The majority of the negative impacts had a medium-high rating prior to mitigation, which were then decreased to medium-low post-mitigation and final significance rating scenario.
- The proposed expansion of the existing opencast pit at the mine has the potential to impact negatively on the surrounding environment. However, the impact assessment conducted by the EAP and specialists concluded that the foreseeable impacts can be mitigated to acceptable levels through the implementation of the proposed mitigation measures.
- Air Quality will only be impacted on slightly and will still fall within all the acceptable levels.
- Ambient noise will only be impacted on slightly and will still fall within all the acceptable levels.
- The groundwater quality and quantity will be impacted on, however, if mitigation measures are implemented as recommended by the specialist this can be managed to acceptable levels.
- No aquatic resources or biodiversity have been identified by the specialist within or adjacent to the study area.
- Terrestrial biodiversity, plant and animal species and potential SCC will be impacted by the development. However, the specialist is of the opinion that the activity may proceed, provided that the mitigation measures be implemented.
- Heritage resources will be impacted by the development. However, the specialist is of the opinion that the activity may proceed, provided that the mitigation measures be implemented.
- Consultation with the community and landowners will be conducted in order to capture any comments or concerns regarding the proposed activities and to ensure the community and landowners are kept informed and allowed to raise issues. The concerns raised will be included in the final BAR.

9.2 COMBINED SENSITIVITY MAP WITH LAYOUT

The layout map showing the location of the activity against the identified as part of the Basic Assessment Process, Specialist Studies the Provincial Biodiversity Plans (refer to Figure 57 below). The proposed expansion area is located on indigenous vegetation area that is degraded and a small area is already modified. The identified sensitivities included heritage features, and biodiversity features as described in this report.

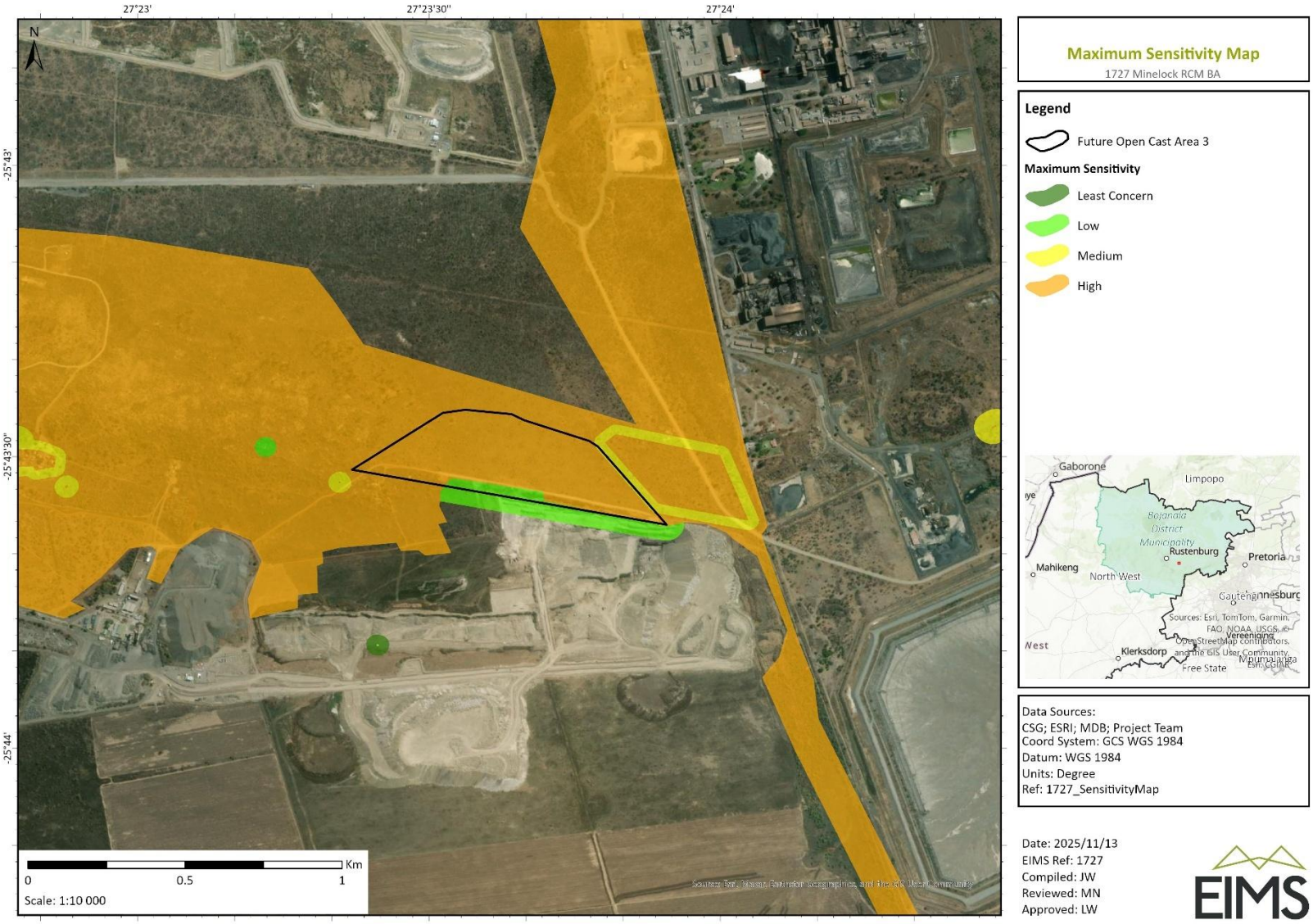


Figure 57: Consolidated sensitivity layout map

9.3 SUMMARY OF POSITIVE AND NEGATIVE IMPLICATIONS AND RISKS

The proposed expansion of the opencast pit will have some positive impacts (need and desirability) i.e. extending employment opportunities at the mine and in turn have a positive impact on the continued economy of the area. This was calculated to have a high positive final significance. Several negative direct and indirect impacts have also been identified, that may result from the expansion, such as reduced air quality, ground water impacts, sensitive habitat impacts etc. These impacts ranges from short to long term and were mostly rated as medium-low and low for a final significance, with only three impacts with a medium-high final significance, which includes:

- Air pollution as a result from dust generation activities (i.e. blasting, hauling, crushing, and stockpiling) during the operational phase;
- Clearing of vegetation leading to soil erosion and loss of topsoil; and
- Ongoing habitat destruction and disturbance to fauna from noise, dust, and artificial lighting.

It should be noted that this is only and expansion of existing mining and will therefore not have a significant increase in the existing impacts of mining in the area.

The implementation of the proposed mitigation measures will ensure that the negative implications and risks of the project are reduce. The positive impacts may be increased by putting in place certain measures as recommended. Appropriate mechanisms for avoidance and mitigation of these negative impacts are included in the EMPr. The potential negative impacts are described in Section 8.3.

10 PROPOSED IMPACT MANAGEMENT OBJECTIVES AND OUTCOMES

The management objectives are to minimise the socio-economic and bio-physical impacts of the proposed activity in terms of the perceptions and expectations of I&APs. The outcome to be achieved is to lessen the impact through the following measures:

- Adhere to an open and transparent communication procedure with stakeholders at all times;
- Ensure that accurate information regarding the opencast expansion and the resultant lack of requirements for site access and labour is communicated to I&APs;
- Ensure that information is communicated in a manner which is understandable and accessible to I&APs;
- Prevent the unnecessary destruction of, and fragmentation, of the vegetation community;
- Prevent the loss of the faunal community (including potentially occurring species of conservation concern) associated with the vegetation communities;
- Limiting the activity to the defined area and only impacting those areas where it is unavoidable to do so otherwise;
- Enhance project benefits and minimise negative impacts through consultation with stakeholders;
- To limit interference with existing land uses as far as possible during expansion activities;
- Ensure an approach that will provide the necessary confidence in terms of environmental compliance;
- Prevent the further loss and fragmentation of vegetation communities and the CBA areas in the vicinity of the project areas;
- As far as possible, reduce the negative fragmentation effects of the activities and enable safe movement of faunal species;

- Avoid damage to road infrastructure;
- Prevent water quality contamination and availability; and
- Maintain safety to surrounding communities.

11 CLOSURE PLAN AND FINANCIAL PROVISION

Rehabilitation must be conducted in accordance with the existing approved rehabilitation plan.

11.1 THE CLOSURE OBJECTIVES, STRATEGIES AND ACTIONS

The rehabilitation of the mine will require significant levels of control and monitoring during implementation if the desired objectives are to be achieved. In brief, these objectives are:

- Produce a free draining, and stable topography (landscape);
- Ensure erosion free, sustainable vegetation;
- Return rehabilitated land-use to the pre-mining environment where possible;
- Minimise negative impacts and maximise positive benefits on the local community;
- Follow a comprehensive consultation and communication process with all stakeholders.
- Prevent soil and surface/groundwater contamination by managing all water on site to acceptable and agreed standards; and
- Maintain and monitor all rehabilitated areas following re-vegetation and, if this monitoring shows that the objectives have been met, make an application for closure.

RCM aims to employ concurrent rehabilitation methods (direct replacement) of overburden materials from the current mining strip to the completed mining strips (open voids) with the ultimate goal to return the project area as far as possible back to the most sustainable landscape either the original landscape/topography or to a novel topography that is free draining and matches the surrounding topography.

Based on preliminary calculations done thus far it is assumed that there should be enough material to backfill the open pit that will be left once mining has ceased. In addition to this there should be enough material to rehabilitate and profile the area back to the pre-mining topography or close enough to the pre-mining topography as possible. In the event that the area cannot be rehabilitated back to the pre-mining topography, then the area must be rehabilitated to a state that matches the surrounding topography. Special attention must be given when placing material back into the pit and profiling to ensure that the landscape is free draining and that no ponding of water occurs. It is always important to ensure that there is a reserve of topsoil material for the touch up applications, to fill small depressions that may occur as a result of subsistence.

The closure objectives serves as guidelines to what the rehabilitation plan should entail. The rehabilitation plan will describe how rehabilitation need to be undertaken and will include management of soil resources and replacement of soil once mining has ceased. In addition to this, the rehabilitation plan contains information pertaining to reshaping landforms (topographical plan), operational and post-closure water management, replacement of soils, revegetation of the landscape and monitoring and maintenance. The successful rehabilitation of the site will ensure the rehabilitated area is free draining, erosion free and will produce sustainable vegetation as per the closure objectives stated above.

11.2 FINANCIAL PROVISION

The additional financial provisions applicable to this pit is as follows:

Closure liability costs were calculated by means of the DMPR standard method of assessment of mine closure. The closure liability calculations only focused on the additional opencast area of the pit and the cost for

rehabilitation and closure for the proposed site according to the DMPR guideline format and **is R 4 112,724.76**. (Refer to Appendix F4).

RCM will update its financial provision annually and will contribute to a trust fund or other form of financial guarantee for rehabilitation provision, as required in terms of Section 24P of NEMA, as amended. Contributions to the fund will be made in accordance with the requirements of tax legislation and policy and this will be made up in a manner acceptable to the DMPR.

12 ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION

The following conditions are recommended for inclusion in the Environmental Authorisation:

- All mitigation measures included in the Basic Assessment Report, EMPr and associated specialist studies report must be adhered to;
- The existing Dust Management Plan for the Mine should be reviewed and amended where required, and follow an iterative process, including: implementation, monitoring, reporting, reviewing and adjustment to the necessary steps. It is recommended that the current dust fall monitoring network be maintained and or amended as needed, and the monthly dust fall results used as indicators to tract the effectiveness of the applied mitigation measures. Dust fall collection should follow the ASTM method as per the NDCRs.
- Currently there are no groundwater monitoring boreholes at the pit areas. Geophysical surveys need to be conducted on site and around the facility to determine the placement of monitoring boreholes in an upgradient position, on-site and down gradient position of the pit areas.
- Monitoring of water quality to ensure water quality is to standard required in the new boreholes to be drilled.
- 24-hour aquifer testing of boreholes to determine aquifer parameters for the aquifer to be conducted.
- Monitoring of abstraction volumes in pit sumps and monitoring boreholes water levels to ensure impacts are managed should be conducted.
- RCM should ensure that monitoring of erosion and compaction on site during construction and operations continues.
- The existing AIP management plan must be reviewed and implemented and amended where required to prevent the further spread and proliferation of AIP species to the surrounding areas.
- Safe operating systems and procedures are to be implemented during operation of the facility.
- The rehabilitation plan and financial provisioning for the mine, must be updated and approved by the relevant authorities and implemented.
- The mine must implement a community-friendly external grievance mechanism in conjunction with farmers and communities.
- Stakeholder Engagement will continue throughout all phases of the activity, to ensure the community and landowners are kept informed and allowed to raise issues. These issues will then be addressed through a grievance mechanism; and
- The applicant should adhere to the conditions of the EA, EMPr and the Specialist reports for this project.

13 DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

Certain assumptions, limitations, and uncertainties are associated with the BAR. This report is based on information that is currently available and, as a result, the following limitations and assumptions are applicable:

- The project scope and descriptions are based on project information provided by the client;
- The information presented in this report is based on the information available at the time of compilation of the report;
- It is assumed that all data and information supplied by the Specialist, Applicant or any of their staff or consultants is complete, valid, and true; and
- The description of the baseline environment has been obtained from specialist studies.

Furthermore, certain assumptions, limitations, and uncertainties are associated with the BAR according to the appointed specialist studies and these are detailed for each aspect below.

- Groundwater Assessment - Hydrology Impact Assessment – Hydrogeek Consulting.
    - The geology was based on the 1:250 000 published geological maps as well as 1:50 000 topographical maps.
    - QGIS online aerial imagery was used in the layout of the various maps compiled for the current report. The imagery may well be dated and has been used for reference only.
    - The model is used for decision making and should be applied accordingly. Modelled impacts may vary at any point and on-going monitoring is required to actively manage the proposed mining activities and possible impacts.
    - No site characterization boreholes were drilled for this investigation; aquifer parameters and hydrostratigraphic units were assumed based on historical data and similar studies.
    - The investigation utilized data from field surveys and existing monitoring as a snapshot, with further trends to be verified through ongoing monitoring as outlined in the monitoring program.
    - The numerical groundwater flow model was developed using site-specific information, excluding influences from neighbouring mining developments.
    - The development of the underground mine from Area 3 was not considered in the impact assessment and modelling.
- Terrestrial and Aquatic Biodiversity, Plant and Animal Species and Soils and Agricultural Potential Compliance Statements – The Biodiversity Company.
    - It is assumed that all information received from the client and landowner is accurate;
    - All datasets accessed and utilised for this assessment are considered to be representative of the most recent and suitable data for the intended purposes;
    - The assessment area (PAOI) was based on the footprint areas as provided by the client, and any alterations to the area and/or missing Geographic Information System (GIS) information pertaining to the assessment area would have affected the area surveyed and hence the results of this assessment;

- The project description was based on information provided by the client, and any alterations to the area and/or missing data pertaining to the development would have affected the area surveyed and hence the results of this assessment;
- Invertebrates, and avifauna do not form part of the scope of work for this assessment;
- The area was surveyed during a single site visit, therefore, this assessment does not consider temporal trends;
- The current report is based on a site survey conducted from the 14th to the 15th of April 2025, undertaken for a previously defined PAOI. This survey was conducted during the early dry season, and as such, certain flora and fauna may not have been present or observable due to seasonal constraints. The newly delineated PAOI overlaps only with the northern section of the original PAOI. Due to access restrictions during the initial survey, the findings presented herein are based on representative sampling, with data extrapolated from the previous survey;
- Whilst every effort was made to cover as much of the PAOI as possible, representative sampling was completed, and by its nature it is possible that some plant and animal species that are present within the PAOI were not recorded during the field investigations; and
- The Global Positioning System (GPS) used in the assessment has an accuracy of 5 m and consequently any spatial features may be offset by up to 5 m.

- Heritage Impact Assessment.
  - Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, amongst others the subterranean nature of some archaeological sites and existing vegetation cover. However, most of the study area was accessible for the fieldwork survey.
  - Fieldwork was also focussed on areas that were not previously disturbed by farming/mining, thus concentrating on areas with the highest potential to yield indications of the possible presence of heritage resources.
  - Therefore, should any heritage features and/or objects be located or observed outside the identified heritage sensitive areas during construction activities, a heritage specialist must be contacted immediately. Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time as the heritage specialist has been able to make an assessment of the significance of the site (or material) in question. This also applies to Burial Grounds and Graves (BGG). If any BGG are located or observed during the course of the development, the procedures and requirements pertaining to BGG will apply as set out IN specialist report and the EMPr.

14 REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED

The section below gives a reasoned opinion on why the activity should be authorised as well as conditions that should be included in the authorisation.

14.1 REASONS WHY THE ACTIVITY SHOULD BE AUTHORISED OR NOT

The impacts on the environment can be mitigated through open communication with the community, landowners, and implementation of the proposed EMPr mitigation measures. It is ,therefore, the opinion of the EAP and appointed specialists that the proposed activity should be authorised as long as the proposed mitigation measures are implemented. This will ensure continued employment of the existing workforce.

14.2 CONDITIONS THAT MUST BE INCLUDED IN THE AUTHORISATION

The following conditions are recommended for inclusion in the Environmental Authorisation:

- All mitigation measures included in the Basic Assessment Report, EMPr and associated specialist studies report must be adhered to;
- The existing Dust Management Plan for the Mine should be reviewed and amended where required, and follow an iterative process, including: implementation, monitoring, reporting, reviewing and adjustment to the necessary steps. It is recommended that the current dust fall monitoring network be maintained and or amended as needed, and the monthly dust fall results used as indicators to tract the effectiveness of the applied mitigation measures. Dust fall collection should follow the ASTM method as per the NDCRs.
- In terms of groundwater monitoring a comprehensive bi-annual analysis of the dedicated monitoring boreholes should be undertaken. Groundwater levels should be monitored monthly in the dedicated groundwater monitoring boreholes and rainfall should be monitored daily.
- RCM should ensure that monitoring of erosion and compaction on site during construction and operations continues.
- The existing AIP management plan must be reviewed and implemented and amended where required to prevent the further spread and proliferation of AIP species to the surrounding areas.
- Safe operating systems and procedures are to be implemented during operation of the facility.
- The rehabilitation plan and financial provisioning for the mine, must be updated and approved by the relevant authorities and implemented.
- The mine must implement a community-friendly external grievance mechanism in conjunction with farmers and communities.
- Stakeholder Engagement will continue throughout all phases of the activity, to ensure the community and landowners are kept informed and allowed to raise issues. These issues will then be addressed through a grievance mechanism; and
- The applicant should adhere to the conditions of the EA, EMPr and the Specialist reports for this project.

15 PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

The Environmental Authorisation is required for a minimum of five (5) years.

16 UNDERTAKING

I, **Monica Niehof**, declare –

- The correctness of the information provided in the reports;
- The inclusion of comments and inputs from stakeholders and I&APs;
- The inclusion of inputs and recommendations from the specialist reports where relevant; and
- That the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein.

Signature of the environmental assessment practitioner:

Name of company:

Environmental Impact Management Services (Pty) Ltd

Date: 12/11/2025

REFERENCES

- BGIS (Biodiversity GIS). 2018. http://bgis.sanbi.org/ (Accessed: November 2025).
- BirdLife International. 2018a. Circus macrourus. The IUCN Red List of Threatened Species.
- BirdLife International. 2018b. Falco vespertinus. The IUCN Red List of Threatened Species 2018: e.T22696432A131939286.
- BirdLife International. 2018c. Phoeniconaias minor. The IUCN Red List of Threatened Species
- BirdLife International. 2019. Anthropoides paradiseus (amended version of 2018 assessment).
- IUCN Red List of Threatened Species 2019: e.T22692109A155417800.
- Birdlife South Africa. 2015. Checklist of Birds - List of Threatened Species.
- BODATSA-POSA. 2019. Plants of South Africa - an online checklist. POSA ver. 3.0.
- Hydrogeek Consulting. 2025. Open Pit Expansion Area 3 Geohydrological Specialist Input.
- IUCN. 2017. The IUCN Red List of Threatened Species. www.iucnredlist.org (Accessed: November 2011).
- Land Type Survey Staff. 1972 - 2006) Land Types of South Africa: Digital Map (1:250 000 Scale) and Soil Inventory Databases. Pretoria: ARC-Institute for Soil, Climate, and Water.
- Mucina, L. & Rutherford, M.C. (Eds.). 2006. The vegetation of South Africa, Lesotho, and Swaziland. Strelizia 19. South African National Biodiversity Institute, Pretoria South African.
- PGS Heritage. 2025. Proposed Expansion of the Rustenburg Chrome Mine on the Farm Rietfontein 338JQ, near Kroondal, Rustenburg Local Municipality, Bonjala District Municipality, North West Province.
- SANBI. 2009. Further Development of a Proposed National Wetland Classification System for South Africa. Primary Project Report. Prepared by the Freshwater Consulting Group (FCG) for the South African National Biodiversity Institute (SANBI).
- Strelizia 19. South African National Biodiversity Institute, Pretoria South African.
- Skowno, A.L., Raimondo, D.C., Poole, C.J., Fizzotti, B. & Slingsby, J.A. (eds.). (2019). South African National Biodiversity Assessment 2018 Technical Report Volume 1: Terrestrial Realm. South African National Biodiversity Institute, Pretoria.
- South African National Biodiversity Institute (SANBI). 2009. Further Development of a Proposed National Wetland Classification System for South Africa. Primary Project Report.
- The Biodiversity Company. 2025. The Proposed Expansion of Rustenburg Chrome Mine's (RCM) Existing Opencast Pit at their Existing Mining Operations NEAR Kroondal in the Rustenburg Local Municipality in the North West Province.